The Builder.

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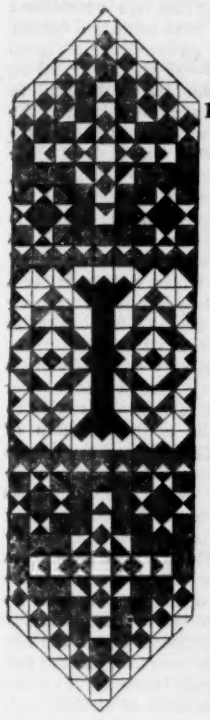
Belfries and Bells.



IF we were asked to name the most characteristic external feature of a Christian Church, we should feel disposed to accord that title to the belfry. The cruciform plan, indeed, may be regarded as generally, though not exclusively, Christian. But it is very far from being a universal feature. Indeed, in the most ancient historic form of the church, the Basilica, this arrangement of plan is absent. When a modern Christian architect, whose genius is as lofty and as subtle as that of our own immortal Wren, strove to consecrate the antique Pagan forms to the service of the modern Christian rite, he could, indeed, produce a magic effect by the intersection of his vaulted aisles. Yet the idea of a cruciform structure, not accidentally, but purposely, planned in that form, does not force itself on the mind of the visitor to St. Paul's Cathedral. In St. Peter's, and, indeed, wherever the form of the equilateral, or Greek, cross is adopted, the association becomes still more shadowy. In fact, wherever the great Oriental element of the dome is developed at the intersection, the cruciform plan fails to lay hold of the attention. You may see that there are lateral recesses, or star-pointed distances, to the great, lofty central hall; but that is a very different matter from the regular association of nave, choir, and transepts.

Again, the orientation of our churches, which is spoken of as a Christian custom, has by no means exclusively, or even distinctively, that character. Orientation is twofold, both in its azimuth and in its signification. There is the alignment directed on the East, the true cardinal point, and there is that which cuts the sunrise-point on a given day; often that on which the Romish calendar commemorates the saint, after whom, in superstitious times, the church was subordinately named—under his invocation, to use the technical phrase. Not unfrequently these two lines are represented in the same church, in nave and chancel, to the great confusion of architectural elegance. But orientation is common to the temples of the East, and to many of those of Greece. Exact alignment in azimuth is an astronomical characteristic of the Great Pyramid, in the sides of which a minute deviation from the true meridian of 4′ 35″ seems to measure the displacement of the poles of the earth that has occurred during the long period of 5,400 years on which that colossal tomb has looked down. Orientation, again, as defining a kebleh, or prayer-point, and thus pointing to Jerusalem or Mecca, is common to the synagogue and to the mosque. Little praying compasses are to be met with in the bazaars of the East, which indicate not the north, but the east, and tell the devout pilgrim in which direction to turn his face at the appointed hours of morning and evening prayer. And we find the sunrise-line of the summer solstice structurally indicated in our own magnificent Stonehenge.

But the belfry is a structure which is, on the one hand, almost exclusively connected with buildings of the Christian rite, and of which (since our meeting-houses have become things of the past, and nonconformist sects have ceased to hide their modest chapels in holes and corners, the obscurity of which was only too welcome in the days of by-gone persecution), there is scarcely a place of worship so poor that it does not show at least the homologue or the symbol. The nearest approach to the belfry may be found in the minaret. But the sound principle of "purpose defining form" comes in here to prevent confusion. The belfry, whether it be tower, turret, or steeple, is an architectural feature originally conceived for the suspension and the housing of bells; a lofty aërial structure, giving shelter from storm, and from direct sun rays, and pierced with free apertures, from which the melodious voices of the chimes ring out loud and clear, and the full deep tone of the *bourdon* may measure forth the hours, by night as well as by day. The minaret, on the other hand, is essentially a lofty turret, crowned with a projecting or open balcony, whence the shrill voice of the muezzin may be heard calling on the faithful to pray; a relic, in the stern refusal of mechanical means to perform, or to call to the performance of, a religious duty, of some of the loftiest doctrines of an ancient creed. The difference between accommodation needed for the bell, and that proper for the crier, is so great, that no confusion can arise between the forms proper for either of the two.

In the Temple at Jerusalem, before the time of Ahaz, existed a feature which appears to have borne a relation to those outposts of the watchers against time of which we are speaking. It was called the Covert of the Sabbath; and is held to have been the station whence the appointed Levites might watch the setting of the sun on the eve of the Sabbath, and send forth those three peculiar trumpet-notes, the blast, the long note, and the blast, by the sixfold repetition of which the commencement of the sacred day was announced to the city. A natural tower or lofty wall, scarped in the solid native rock, at the north of the great Temple platform, above which it still rises sheer for more than 30 ft., was probably left in this unusual form for the base of the Covert of the Sabbath.

The dome is not a belfry; nor is it readily to be combined with one. The purposes of the two architectural features are too distinct to admit of satisfactory fusion. The dome, formed in antique structures by overlapping stones meeting finally in the centre, has gradually risen in modern use from the flat, and then slightly vaulted, roofing common in those countries where snow never falls, where shade from the sun is a more needful luxury than exposure to his rays, and where all the water that comes from heaven is stored as a precious gift. Supported, in ordinary cases, on joists, or rather on rough logs of timber, in more substantial buildings the roofs are actually formed of flat arches; built of tufa, in districts where this light volcanic stone is available. As a structural expedient, natural to this condition, the centre of the area is first slightly cambered; anon it rises as a sort of shell; then expands into a bubble. The architectural effect thus producible was seized upon by some far-sighted genius, who raised the exquisite form of the dome on a pillared drum, and thus added a special beauty, at once to the external elevation, and to the solemn repose of the interior, of the building thus adorned.

There is, indeed, another theory of the genesis of the dome; that is, from the roofing of a tower. The ordinary gable roof, when applied to cover a circular building, becomes a cone. From the cone to the cupola the transition is not very far-fetched. But, familiar as we are with cupola forms of towers in the countries bordering on the Mediterranean, we still hold that it is from the flat roof that the dome has actually originated; that it attained its beauty under Saracenic rule; and that the cupola forms of Italy are reflected from an Arabic tower; and are not the direct descendants of the cone-roofed turret, which in some districts, as in the romantic valley through which one road from Castelammare to Salerno leads, may be found side by side with them.

Another form of sheltered turret may be named, but it is one which has had no discernible influence on occidental architecture. We refer to the pagoda. The hollowed, pointed forms of the roofs and verandahs of this Oriental type of towers evidently simulate the droop of the textile fabric, umbrella or tent, which preceded the roof of solid materials. This tent-like form is an outline equally distinct from the level roof, from the gable, and from the cupola, or its development, the dome. But though the pagoda does not appear to have been the lineal ancestor of the belfry, it was at least its chronological predecessor. The angles of these buildings are often adorned with bells. Bells were used by the Chinese as much as 4,000 years ago; and the mention of them as dividing time for public information, is 600 years anterior to that of the golden ornaments to the vestments of the high priest, in the Pentateuch. These precious bells were probably like those used for horse-collars in Italy, and for children's corals in England: hollow globes with a slit, and a loose clapper enclosed. The sound of these, if made of gold, must have been extraordinarily sweet. The gong, whether older or later than the bell, is an instrument of much musical power. We must not omit to mention the fine tones producible from steel bars.

Leaving aside the cupola form as a foriegn product, hardly naturalised among us (the glorious instance of St. Paul's serving as an exception to prove the rule), the Christian character of England may, as a general division, be ranked under the head of those furnished with towers, and those adorned with spires. Of course, there is a wide border-land, where tower and spire march, or where wedlock of all kinds,—happy equable union, or disproportionate and ridiculous bondage,—is illustrated in structural form. Watford Church, Herts, and some others in the same county, may serve as examples of the latter. On a large tower, which a certain massive solidity might render respectable by itself, is perched a sort of diminutive extinguisher, the design of which is one of those mysteries which it is equally hard and useless to solve.

The origin of the tower, there can be little doubt, is military. We are not prepared to state that the distribution of the tower churches in England marks districts formerly exposed to the ravages of the Danes, or specially liable, from other causes, to constant danger. The topographical likeness of our old churches is so marked,—certain features are so local, so characteristic of a particular district,—that the detection of their origin cannot be beyond the reach of intelligent investigation. But a solid, substantial fortalice, in which, first, the clergy, and then the immediate parishioners, might find refuge, and from the summit of which they might both watch against attacks and give signals of distress, is, both in England and the Low Countries, the historic reality of many a church tower.

The spire is scarcely debateable as to its origin. Its growth from the high stone roofs of towers of the tenth and eleventh centuries, as seen for example in Normandy, to its culmination in Vienna and Freiburg, is plainly shown. The idea of its being a finger-post, pointing heavenward, is perhaps something more than mere fancy.

It must be confessed that in the act of hanging and of ringing bells, we have hitherto gained but little from the advance of mechanical knowledge. It seems to be taken for granted that to produce a pure full tone from a bell, whatever be its weight, it must be swung. That is to say that the cup-formed mass of metal, hung at a lofty height from the ground, must be rocked until it swings through a semicircle, with its mouth quite vertical, while the impetus with which the freely-moving clapper, suspended from the bottom of the cup itself, strikes the inside of the bell, produces the desired tone. And if we compare the tone of a bell thus rung, with that of another, or even of itself when fixed in place, and struck with a hammer on the outside of its rim, the dull, heavy, odious sound thus produced seems to testify in favour of the assertion.

But that while first the application of springs, then the use of rails, and thirdly the invention of steam-power, have raised our rate of travelling from 2½ miles to 25 miles an hour, it is rather too bad that the mechanics of so cheering a description of public music as that which we may derive from the belfry should have been almost entirely neglected. The hanging of bells so as to ring them, in the old up-ending style, has proved so destructive to our belfries as very seriously to discourage this once favourite source of melody. In St. Alban's, for instance, before the late repairs of the abbey, the fine peal of bells had not been rung for years,—if we remember rightly, not for centuries,—for fear of bringing down the tower. And this, it is very likely that they would have done. But the danger consisted, not in the pure, full tones that might have been educed from the bells, but in the clumsy, reciprocating action of the ringing, by which the whole weight of each bell was made to act as a hammer on the beams on which it was suspended, and thus on the masonry of the tower. Whenever great speed or great weight is concerned, reciprocating action has a very destructive effect. One main reason why we have as yet realised so little of the mechanical force that calculation tells us is due to the combustion of a given quantity of coal in our steam-engines is, that we have not yet succeeded in obviating the reciprocating action of the piston. Mechanics have long instinctively perceived this fact,—although the construction of a rotary steam-engine has hitherto been as unattainable as the philosopher's stone.

There can be no doubt that the mechanical skill of the present day is such as to enable us not only to give such a blow to a bell by an unconnected clapper as shall produce the same sound as that obtained by the process of ringing, but to do something more. It would be possible to institute such a series of experiments as to the relative weight of bell and clapper, and the velocity at which the latter should strike, as should enable us not only to rival, but very far to excel, the effects that can now be produced by the most skilful ringers. When we remember that a bell, according to the part of it which is struck, will emit a third, a fifth, and an octave to its consonant, or true note, it seems not impossible that by the use of more than one hammer to each bell an effect something resembling the double-stopping of a violin may be produced, adding wonderful richness to the aërial harmony. Improvement in bell machinery is not altogether a thing of the future, for Messrs. Gillet & Bland, of Croydon, have applied to a set of Belgian bells at Boston, Lincolnshire, and elsewhere, a carillon machinery that is spoken of as highly satisfactory.

Old-fashioned carillons, rung by the rude and simple machinery of a barrel, pins on which pull wires that move the hammers that strike the bells, exist in the two churches which we have named, those of St. Alban and of Watford. There is a certain music in the sound. But those who are familiar with this part of the country are well aware of a peculiar stiffness in these chimes, which leads to the expectation that each note struck is the last that will be audible. How far this depends on actual tone, as produced by a fixed hammer, and how far on the defective character of the machinery employed, we cannot now decide. At all events, we freely admit the usual inferiority of mechanical chimes to those which are rung by the best ringers. But we should compare the results of very old and imperfect machinery, not with the best, but with the rudest, manual work. No reason exists for doubting that mechanism may attain a perfection of performance in the way of extracting music from bells far in excess of our present experience.

With the return to a mechanical mode of producing musical notes of the flight of time, the true character of the spire, as affording the best form of belfry, will become more evident. The architectural question as to perforating this graceful finish of our churches will then be a question no longer. When the destructive effect of our present barbarous mode of producing sound from our bells is done away with, they may advantageously hang tier upon tier, utilising for their abode a space which is now preserved solely for its picturesque effect. Nay, more, the music of the chimes would have imparted to it a new and peculiar beauty from the arrangement of the bells at levels proportioned to their sizes. We all know the effect of the *vox angelica* or *vox cælestis* stop of such an organ as that at the Albert Hall or the Alexandra Palace; and are aware that part of the surprising beauty of their tones depends on the lofty elevation from which the pipes utter their voices. Thus, when the shrillest treble of the bells comes down upon us with a sharper and more earthward inflexion than the vibrations of the deeper-toned members of the choir, an effect may be produced from an element now altogether neglected. If any lingering in time should be perceptible from the increased distance to be travelled by the sound, this can be allowed for in setting the carillon. Thus, our steeples will be at once more graceful, as pierced *au jour*, and choral, as well as symbolic, features of the Christian Church.*

A musician who touches on no topic that he does not adorn; whose industrious honesty in searching out all the truth of any subject that he takes in hand, and then in stating his results, whatever they may be, is perhaps unique,—the Rev. H. R. Haweis, in his charming work called "Music and Morals,"—has given us a chapter on "Bells and Belfries," which we should be glad if we had the space to reproduce. He tells of the famous old belfry at Tournay, which dates from the twelfth century, and is built on a Roman base. It now contains forty bells. Four brothers relieve one another in constant watch on its summit; and when a fire breaks forth within the watcher's range of vision, the great bell is at once tolled in alarm. On stormy nights this aërial and illuminated watch-tower rocks like an ocean lighthouse. On the highest accessible part of the spire of Notre Dame at Antwerp, which rises 403 ft. from the base of the tower, as well as on that of the Cathedral of Strasburg, 468 ft. above the level of the sea, (though less in structural height than its sister of Antwerp), he has stood to listen to the bells. *Non sunt loquelæ, neque sermones; audiuntur voces eorum*, is the beautifully appropriate motto on a bell in the tower at Antwerp, cast in 1658. From the marble *Duomo* of Milan, "o'er all the Italian plain;" from St. Peter's over that *campagna* which some of us may yet see blossom with the rose; from the towers of Ghent, Brussels, and Louvain, over the canal-cut low countries; these sacred songs without words are heard in daily and nightly music. Why, Mr. Haweis may well ask, is there no proper peal at Salisbury? A day or two since, in one of those quaintly-built and quaintly-named courts that lie between St. Paul's and the Thames, the full joyous peal of the bells, from some hidden City church, burst on the ear with unexpected melody. The peal still rang on, when we had reached the cathedral yard, but was then altogether drowned by the roar of the traffic.

We must add one word as to the bird that generally presides over the belfry. Perched on the loftiest spire, or furnished with a roost on a corner, or even on each of the four corner turrets, of a church tower, is usually to be seen the image of the cock. Displaced by the invention of the clock from his time-honoured station of the measurer of the night watches, to the bird of morning has been committed, as if in compensation, the duty of indicating the direction of the wind. It is often said that the weather-cock is the attribute of St. Peter. It would hardly, however, be selected to do honour to that apostle. Neither is it limited to, nor always present in, churches called after his name. It is rather, we think, a relic of the extreme veneration in which Chanticleer was held in antiquity—as witnessed alike by Grecian fables, and by the Agada of the Talmud—for his divinely-implanted knowledge of time, and his energetic and faithful pertinacity in communicating that knowledge to the world. An appropriate reflection for our readers at a period when—

> "The bird of morning singeth all night long,
> So holy and so blessed is the hour."

* At the Church of Our Lady in Chalons-sur-Marne, a bell is hung in the topmost part of the (wooden) spire, with openings all around it.

THE ROYAL ACADEMY AND ITS OLD MASTERS.

IN undertaking to supply the loss occasioned by the withdrawal of the best-esteemed favour of the British Institution (when it resolved to sleep the sleep of the just—or *unjust*, so far as the loud cry of modern masters would lead to belief), the Royal Academy organised,—for the magnificence of its scale made it quite a new thing,—such an exhibition of the basis of their own position as "the works of the old masters, associated with works of deceased masters of the British school," could by great means afford, it was a task. There were no such collections ever seen in London before, as the three years' run of them at Burlington House has made for a course. The Royal Academy has run a winning race, and with the usual result,—most thanks from those who have gained most by it.

The catalogue, as before, very advisedly gives the notice of pictures being placed under their furnished designation. If England were as rich in old picture-treasure as the additional help of Rome, Florence, Bologna, Munich, and the Hague together, could make it, the product of the mine would not be a growing one. If kind words were nearly as scarce, even, as the real calls for the use of them appears to be, the Royal Academy would be very much entitled to gratitude from all who can value rightly a great service, for the magnificent displays by which it has done so much towards imparting to the multitude knowledge that hitherto was the privilege of the few to attain, of what is best worth teaching and worth most learning from old masters. Pen and pencil will record the time-beats of civilisation's pulse to show its health or weakness up to the last hour of its existence, and the grandest, strongest buildings, as if they were its bones, will crumble then. Life, indeed, is as nearly dependent on Art as on Nature, and the fine arts have a much wider and higher mission than that of administering to epicurean gratification, or of confining their beneficent influences to the refining of already refined minds.

The fourth of these annual Exhibitions of works by the old masters—some native, to rank with the best of them,—should be seen by every one. They may be likened to the old feasts of legend, whereat the skull presided; for there may not be many more to follow for those who enjoy them now. The tinge of sorrow the proverb makes the necessary associate of all pleasure, will not fail those who must think this source of delightful instruction not inexhaustible. Millions of eyes have opened and closed on this turning world since old masters such as Ghirlandajo, who taught Michelangelo Buonarotti, Luca Signorelli,—who did even more than that for the Tuscan demigod, for he helped to direct him in his full strength and knowledge;—or Sandro Botticelli, who did for himself such wonders as frightened the monks, by the effects produced on the unjust critics of the view he gave of heaven,—were young. Generation on generation has lived, laboured, and gone to rest; hosts of bright, honest-eyed children; right and wrong headed, but strong-headed men, and white-haired councillors have waited and worked and watched, all actuated by the one belief that progress was as inevitable as age. And so it is: a needle is made from the same metal as a 35-ton gun, and being the more useful instrument of the two, is the more valuable. So long as metal remains, it will be cast or wrought, or over-wrought; and progress will progress much as progress ever did. For the world turns round, and in its course passes the same stages over and over again. If every particle of dried brain were a germinative seed, to what a pitch of progress should we have arrived now; if such progress were ever really to be, as growth upon growth might make to be possible, and which the very thought of is enough to make evidently impossible, there would be finer pictures to be seen than ever were seen. In what the Royal Academy by judgment and rare opportunity is enabled to verify for genuine production, they leave a little room for speculation; or, to be more correct, a smaller gallery—No. IV. Science helps spiritualism here, if it will have nothing to do with it elsewhere, and the touch of dead hands that lifts facts, embodies ghosts, and brings visions of floating ideas to comprehen-

sible form of them, is perceptible here,—and with light, too,—for the sceptic: the sceptic who would question such a medium as old art in its intensity of purpose, and devotedness to whet that purpose was. Signorelli died 350 years ago, and yet he will speak here, and account in some degree for the religious fervour a painter's preaching may awaken (162); even more years are to be counted since Domenico, Corradi, or Ghirlandajo was ministering in the same way (163).

Sandro Botticelli is an instance of the absorbing claim genius asserts. Brought up with care, taught, and learning easily, yet, was he so discontented, so eccentric in his habits, that his father, a worthy Florentine citizen, "turned him over in despair to a gossip of his, called Botticello, who was a goldsmith." So says Vasari; proceeding to tell of the constant intercourse that a close connexion between the goldsmiths and painters of the period engendered, and how Sandro found his calling; becoming enamoured of painting, and resolved to devote himself entirely to that vocation; of how diligent he was; how successful in obtaining credit and reputation, to the consequence of being appointed to execute various commissions, some of them particularised and described, until we come to the very picture (191) of which the Duke of Hamilton is the fortunate possessor. It was painted for the church of San Pietro Maggiore, Florence, on the commission of Matteo Palmieri, who, if he gave the whole scheme of the work, could not have given that appreciation of what is lovely and graceful; nor the scientific skill that marks the performance to be more actuated by innate direction, than any bias of command or payment could readily have ordered. The admirable perspective arrangement of the numerous figures; their varied attitudes, involving foreshortening and a freedom of movement truly astonishing in archaic representation, are among the charms of the work. In "The Assumption of Our Lady" (191), the zones of heaven are shown inhabited by Patriarchs, Prophets, Apostles, Evangelists, Martyrs, Confessors, Doctors, Virgins, and Hierarchies; according to the design furnished by Matteo, "who was a very learned and able man." He and his wife are depicted kneeling each side a tomb, in which lilies are blooming. "But although this picture is exceedingly beautiful, and ought to have put envy to shame, yet there were found certain malevolent and censorious persons who, not being able to affix any other blame to the work, declared that Matteo and Sandro had erred gravely in that matter, and had fallen into grievous heresy;" and so the altar it adorned was interdicted, and the picture covered from view. It has passed into better keeping now, and is a very valuable possession.

Raffaelle, "The Urbane" (176); and Francia (167), who is supposed to have fretted the remnant of his life away in his recognition of Raffaelle's supremacy; and Jan Van Eyck (171), who did and died before these began to do; and Masaccio, with others, who coloured the past; Jan de Mabuse (172); Albert Durer (173); and Lucas Van Leyden (179) and Lucas Cranach (170), who brings the Reformation into mind, and many troubles that have followed it, with all its benefits; Quintin Matsys, the clever blacksmith, whose strong passion led to another kind of execution than newspapers too often record, all rap in answer to the spell of their names. But we will leave the spirits for a plainer guidance, and the science that shall anatomise them, to John Hunter, F.R.S. (158), who is too splendidly restored to healthy appearance not to make it an easy matter for him to substantiate the possible revivication of ghosts. Tintoretto, the Carracci, Murillo, with many other names to make the catalogue full of promise for the walls to bear out; Rubens, who looked better in any one of the three preceding exhibitions than he does now; the "Daniel in the Lions' Den" (131) tending to the corroboration of admiration for Sir Edwin Landseer, as much as it can do for its author; and "Diana returning from the Chase" (207) is no better a specimen, when compared with many a well-known specimen of his florid magnificence. Titian's masterpiece in portraiture, the grandly composed and painted "Cornaro Family" (146), has long ago been adjudged all the praise so noble a work would secure. Holbein's "Two Ambassadors" (114), supposed to be Sir Thomas Wyatt and his secretary, sent by Henry VIII. to Paris on some particular business, that made its successful result worth notifying, is a marvel worth a pilgrimage to behold. The possible combination of breadth and force with the achievement of the minutest finish, so thoroughly perfect in every detail, is manifested in every inch of it: it puts to shame any notion that too close an attention has been bestowed on minor matters, for in spite of the utmost elaboration of dead things, so generally complete that the interest of everything has to be weighed with the interest of everything else, the two men by their absolute vitality take just that prominent position flesh and blood would in reality assume, and all the importance that naturally belongs to them.* Rembrandt, Velasquez, Vandyck, and Sir Joshua Reynolds, Romney and Gainsborough, bear out to the full meaning of it this real prominence of humanity, all the more recognisable and real-looking in the simpler, quieter show of it. There is more life in Gainsborough's exquisite portrait of a young lady assuming the humble position for the natural gracefulness that a rustic, a cottager, would be sure to become possessed with under the painter's best treatment (53) than any such dancing joy "Madame Baccelli," by jumps to display her appreciation of it, could give a positive notion of. Who can care for such flagrant frippery (56), admirably given though it be in varnish with strong perfume in it, to cover that which all the paint in the world could never make pretty, nor the finest painting save from coarseness and obtrusive vulgarity,—qualities that have been emphasized very strongly, one must think, since Gainsborough's time? If Sir Joshua Reynolds was not quite inimitable, there are some of his works of incomparable excellence, even when side by side with others of his own. Apart from the taste that fashion fashioned, his superiority will remain extant to the last, or so long as the perishable threads and grounds of his pencil's discourse can be made to hold out the argument. Reynolds, "grand and graceful," is not much more forcibly represented in the present collection than Gainsborough is fairly; he is more really to be identified with the series of portraits of the "Keppel" family, or the charming "Mrs. Stanley" (112), than by some specimens of extra-faulty drawing and meretricious graces. In his strength and in his weakness he was distinct enough to divide himself from his follower,—Romney, whose portraits of "Anne, wife of George, third Earl of Albemarle, and her son William Charles" (108); of "Mrs. Drummond Smith" (15), with a quaint idea of a becoming head-dress that rivals some not of the ugliest to be seen nowadays; or of "Henrietta Countess of Warwick and her Children" (26); and "Mrs. Carmichael-Smyth" (49),—lovely enough to have left the *y* to the assertive *I*, and to make ordinary name extraordinary distinction,—would yet tend to account for that division of opinion that created a "Romney faction" in opposition to those who upheld the supremacy of Reynolds, if allowance be made for the pleasurable excitement derivable from contradiction; "party feeling" being one of the strongest to act on sense, especially when there is not too much of it for other feelings' play! There must always be factions, however. Leisure for such intellectual improvement as examination of these collected pictures must surely afford, is a delightful grant; and though for the better help to instruction it might be wished they had been arranged with more regard to period, school, and class, those who love variety will satisfy their affection plenteously with those whose satisfaction exists in finding food for their dissatisfaction. The difficulties attendant on the formation of such exhibitions as a four winters' course at Burlington House has made memorable, would have been insuperable to most other influences less powerful than the gained respect and confidence the Royal Academy enjoys.

* We gave particulars of this and the Erasmus pictures (also here) some few years ago in describing the curious structure Longford Castle, near Salisbury, where they usually hang.

ON ARBITRATIONS.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary general meeting, on the 6th inst., the paper read was "On Arbitrations," by Mr. Banister Fletcher, associate. We print some portions of it:—

The first thing an arbitrator should do is to consider what is called the *submission*, as it is the foundation of all his proceedings. It would appear that it is not necessary that this submission to arbitration should be in writing, or even verbal; it would appear to be absolutely necessary, however, that the parties intend "to be concluded by the decision of the persons called in, in order to clothe him with the authority of an arbitrator."

Where it is possible, it is certainly desirable, to have the submission in writing, and in one document, signed by both parties; as, if it can be shown the parties intended to refer different matters, the award will be invalid. I have in my mind a case where one party appointed arbitrator to determine a dispute respecting the construction of a lease and the damages sustained, the other, in wording his appointment, alluded only to the construction of the lease, and omitted any allusion to the damages; in consequence, the entire award was void.

That there is much technicality to be observed. For instance, where there is an arbitrator appointed on each side, no such appointment is complete until it has been notified to the other side. I would call attention to the importance of this, because if (as is very usual) the appointment is to be made by a certain day, it will be *too late*, and therefore the appointment void, though the arbitrator be nominated on the day, if the information of the nomination be not given until the day after. Again, the law holds where an umpire is to be appointed before proceeding; that, until the umpire is appointed arbitrators cannot act. Further, it is wise, directly you are appointed, and know who is appointed on the other side, to arrange an early meeting, and to give notice to each party of the day, time, and place. Again, it is well to recollect, that if a party to a reference is bankrupt, the reference is at an end, in most cases, if the other side choose to revoke. Again, a lady marrying during the reference revokes the submission.* Again, death, in most cases, revokes the appointment. Either party may revoke the authority of the arbitrator, but only with the consent of the court. An arbitrator formerly used his own discretion as to allowing evidence to be given before him. Now he has none. He is bound to receive evidence if either party wishes it.

Let me next state what is understood by *a reference on the usual terms*, as they are the terms we nearly always have to abide by. They are,—That the arbitrator shall decide for the plaintiff or defendant. If plaintiff, then assess the amount of the damages (which, however, cannot exceed the amount claimed). The cost of the cause follows his decision. He may award the costs of the reference in any way he pleases. He has unlimited time for making his award.† The death of either party does not abate his authority. He has power to amend the record. All evidence must be taken on oath. The parties must produce all documents relating to the matters in question. The parties are bound to obey his award; not to bring any action or other legal proceedings respecting the matters referred, either against the arbitrator or each other. They consent, further, that if either of them wilfully prevents the arbitrator making the award, he will pay such costs to the other as the court shall think fit. That if either party dispute the validity of the award, the court may refer the matters or any of them back to the arbitrator to reconsider. Lastly, they consent that the order itself may be made a rule of court.‡

Surely with such ample powers the arbitrator would seem to be hedged in on every side so that no opportunity could occur which could stultify his labour. Yet such is not the case. Instances are not uncommon of awards being set aside. It is this accusation of the legal profession, that scarcely any awards, save those made by their own profession, ever stood. I would call attention to one pitfall. It would appear that it is necessary (unless there is a special clause inserted in the submission, that it shall be sufficient for the arbitrator to find in the cause generally for the defendant or plaintiff, unless either party shall request him to decide some particular issues) for the arbitrator to decide on *each* issue in the cause, to render his award binding. The other matters that may set aside our awards are,—If it can be proved it has been obtained by fraud. If it can be shown

* But she and her husband are liable to an action unless they continue the reference.—B. F.

† In practice, however, it is usual to fix a time, giving the power to the arbitrator to enlarge the time if he considers it necessary.

‡ By which the parties are bound by all the provisions of the Common Law Procedure Act, 1854. This Act gives either party power to compel the other to name arbitrator &c

it has been drawn up by mistake. Where a third party who, although he had agreed to join in a submission to arbitration, refused to proceed with the reference. Proof of undue pressure.

Curious it seems that, powerful as the courts are to upset or set aside awards, they have scarcely any power, in fact they are powerless, to amend an agreement of reference, even though it is only desired that it should be made to accord with the original intentions of the parties. I am not alluding here to clerical errors, or to an immaterial variance in an order of reference, as such matters, and such alone, they can vary. I trust I shall not weary you if I quote a case to show how cautiously all must walk who would come near the law. Fancy the extent to which the legal judicial mind can go. The case I quote is, "Rawtree *v.* King," 5 Moore, 167. There, by a mistake of the court's own officer (the associate), who drew up the order, referring all matters in difference between the parties, and not all matters in difference in the cause, they, the court, said they could not alter the order, but that the order of reference must be treated as a mere nullity. I mention this, as I have said, to show the caution necessary in our proceedings, so that we may secure what we fervently desire, justice to those whom we find deserve it at our hands.

Certain interests disqualify an arbitrator, but it is held that they must comprise something unknown to one of the parties; for instance, an architect, though employed by his client to superintend a builder in building a house for him, may be an arbitrator between his client and the builder, even although his remuneration be a commission on the amount of the building charges. One other matter I think desirable to mention, as those who act for the first time have not their feelings under control, and are so likely to be led into expressions of feeling which, though natural, are most injudicious; for this reason, that the courts require the arbitrator to be absolutely impartial, and hold that if the arbitrator uses any expression towards either party which indicates a strong bias or prejudice in his mind, or show that he is actuated by any hostile feeling (and how soon might such feeling be genuinely expressed simply with contempt when the case was seen through, and how cleverly the keen solicitor on the wrong side would irritate to produce the strongest expressions that he might use them for the purpose of upsetting the award), the award may be set aside; and it must be remembered that this setting aside of the award may be accomplished even where there was nothing to impeach the conduct of another arbitrator, who has joined in the award.

Of course we must not have an arrangement with any of the parties to the reference, such as the purchase of their unascertained claims; and it seems it is wise either to deliver a detailed bill of charges before receiving payment, as if this be not done it may render our award open to be set aside, or not to receive any payment until award is made and published. Just a few hints before I close as to the conduct of the inquiry.

The arbitrator having sworn the witness, will be, if fresh to the matter, bothered as to what is evidence, what can be admitted, and what cannot, what questions are proper, and what are inadmissible. I will give a few leading ideas to guide. The claimant or plaintiff opens his case, and it is his duty to prove it as strictly and in the same manner before us as arbitrators as he would have to do were he conducting his case in a court of law, unless "*by arrangement*," when many matters are taken as proved, or with very slight proof and irregular evidence admitted. Still, where the parties are what is called *hostile*, and *will admit nothing*, the law courts must be our guide, and the popular idea that strict evidence is not required must be disregarded. It must be borne in mind that the improper rejection of evidence tendered by either party will set aside an award. Further, that with what the law calls a lay arbitrator improper admission of evidence will have the same effect.*

One of the most important rules is that the best evidence must be given, and until that is exhausted you cannot give what is termed secondary evidence.

This rule excludes hearsay evidence, that is the witness stating what he has heard that A did or said, and nothing as said by a third party in evidence against those who are party to the arbitration, unless it was said in their presence or done with their knowledge. Again, a copy of a letter or other document cannot be read until it has been proved that the original has been lost or destroyed; but if proper steps are taken to procure the production of the original, a copy may sometimes be used. Further, a reply to a letter is not evidence until the letter in reply to which it was written has been proved. Handwriting may be proved by comparison; that is, comparing the handwriting of one document admitted to be written by A, with that of another not so admitted. Plans should be proved by the person making them, and should be made, I may remark, from actual surveys. Deeds thirty years old need no proof of their execution, if they apparently come from a proper custodian of them; and those of less antiquity may now be proved by calling any witness who is acquainted with the signatures. This formerly was not so: further, it must be remembered this does not apply to wills or warrants of attorneys. A deed is not evidence unless it is properly stamped, so that it is necessary for us to have some slight knowledge of the Stamp Laws. Entries in books kept by a person cannot be used by him to prove his case; but his adversary may use them against him; the reason for this being obvious. There is nothing to prevent a man making any entry he might think convenient to assist him, as for instance, payment of money not actually made, but it is not probable he would make entries which he thought would operate against him. Again, the entries being made without the knowledge of the other party; there are similar reasons for not allowing them to be used, as there are for rejecting "hearsay" evidence.

Another difficulty most frequently arising is to decide upon the form of the question to be put to a witness, it being a rule that the party calling a witness must not ask him what is termed a "leading" question (that is a question which indicates the answer that is required), nor (unless the witness is "hostile") can the party calling him examine him, except as to such matters as are direct evidence upon the issues raised, nor ask him questions tending to contradict the evidence he has given. On the other hand, the adverse party can cross-examine a witness for almost any length of time (as we have seen in the famous Tichborne case), and can also examine him and call other evidence to prove that his evidence is untrue.

I have far from exhausted this important branch of my subject, but time and consideration for your patience and kind attention compel me to pass on. One other point only I would mention, as it is so liable to be done, which is, that if you are trying to fix on an umpire, you must not select him by *lot* or *tossing up*. It does seem such an easy way of getting rid of a difficulty, and I have had it proposed; and certainly my opponent has been astonished when I have told him that such a method is illegal. As to our fees as arbitrators, it should be borne in mind they must not be large, or we may be liable to an action to recover what may be considered excessive charges. This is the law, although we are unable to legally recover our fees as arbitrator, unless we have, what we rarely have, an express promise to pay, and then only from the person so promising. One more hint. Directly our award is made, we should send notice thereof to each party, stating where the award can be obtained on payment of the fees, mentioning the amount. Our award must of course be made within the time to which we are limited.

* But if the arbitrator be of the legal profession, this will not have such effect. Is this fair?—B. F

PROFESSIONAL PRACTICE OF ARCHITECTS.*

(3.) *Works.*

I. *Specifications.* — The best possible will describe every portion of the building, systematically giving the fullest particulars (scantlings of carpentry, sizes of doors, girth of mouldings, sizes of stonework, &c. An exceedingly general specification giving no minutiæ, if it accompanies a good, careful, set of drawings, is not bad: it must describe the quality of all materials precisely, allowing the drawings to explain the work in which they are to be used. A mixture of these two kinds, vague in parts and detailed in parts (perhaps even within the limits of the same trade), is a very imperfect document. Every specification of any size should have the trades in the usual order, good marginal descriptions of the contents, and an index. Have a good example or two before you while writing as an aid to memory: various good specimens may be found if necessary in Bartholomew's Specifications, or Professor Donaldson's. Avoid the too frequent custom of asking for the best of every material. The best timber is rarely necessary for ordinary framings: frequently absolutely the best materials are not wanted for joinery: in ironwork, "best" as a description is open to an opposite interpretation, as there are a "best, best," and a "best, best, best," recognised in the trade. Contractors say that they are able to give lower tenders for the works of some architects known to them, because of the definiteness of their instructions and their nice adaptation of materials, &c., to the purposes to be served. If a well-thought-out draft is supplied to the quantity surveyor, and he is allowed to make minor additions subject to your approval, it will often avert little extras; and bring the quantities and other documents into complete accordance. If you take out the quantities yourself you will perhaps defer writing some parts of the specification till the quantities are completed, and your ideas on many details thus settled.

II. *General Conditions.*—The headings for clauses of contract settled between the Royal Institute of British Architects and the London Builders' Society supply these in a skeleton form. The conditions of contract recently issued by the London School Board have a few specialities (differing from the "headings"), but are good, and may be considered a fair precedent.

III. *Cutting down.*—May be requisite when the tenders have been received. This should not be done too ruthlessly; simply to reach down to a certain sum. No architect should radically maim a building, taking out many good decorative features or special characteristics. Of course, the efficiency for the purpose should not be trenched upon; nor anything required for stability or durability cut out; nor the money provision for contingencies, except as a last resort. If the drawings represent, as they should, what the client really wants, only take out things that can be put in again without much difficulty, or that can be added hereafter.

IV. *Getting to work.*—In London, get notices given to adjoining owners as soon as possible (as to works on party-walls, &c.), so that no delay can happen when you want to begin. See the district surveyor personally, if possible, before beginning, and get him, if he will, to look over the drawings. See that the builder gives the requisite notices to him and to the Local Board. See the surveyor to the Local Board, if you can; and thus be sure you are right as to the level of your basement floor and as to the arrangement of the drainage. In fixing, finally, the exact site, do not be influenced too much by the existence of any private roads (if you see they can be diverted), or of any ordinary trees; but put the building where seems best to yourself,—and to the landscape gardener if one is employed with reference to the work. Combine shelter, good access, fall of drainage, good water supply, aspect, and (if to be lived in) good prospect; or get as many and as much of the most important of these as you can. Leave some permanent marks when you have fixed the angle of the building. The trial-holes,—dug before the contract-drawings were made in order to ascertain as to the foundation,—may not have found the weak places; insist, therefore, always on inspecting the open trenches before building is begun. If at all doubtful, do not fail to get all the counsel that wide experience, and also local knowledge, can give. Foundations are not always improved by going deeper; *e.g.*, Wren would have wasted a large part of his funds before he had reached the floor level, if he had not had the courage to build on pot-earth, which had carried the old church, as detailed in the "Parentalia" (at the north-east of the choir the pot-earth was absent, and the foundation consequently carried down full 40 ft.). The trenches should not be open long, or be allowed to fill with water; and any earth softened into a slush should always be removed before building. In the course of execution, insist on condemned materials being taken from the site, or they will perhaps be hidden in the building; see, before you leave the work, that any defect in the scaffolding, any carelessness that may lead to formidable accident, is well remedied; see masonry in danger of injury cased. Supply the clerk of

* From lectures by Mr. Roger Smith. See p. 15, *ante*.

works or the foreman with printed forms of returns; and get a statement sent you weekly giving the state of the building, the works in progress in each trade, the number of workmen employed, and the state of the weather for each day. A building of great importance should, perhaps have a resident architect, who should make most of the drawings, and look keenly after the works. Men in large practice would do well to introduce such a system,—putting younger men into a temporary partnership, and giving to them much of the responsibility and a good share of the honour and the pay attached to the work. See that the vouchers for day-work are supplied as by contract, and checked and agreed upon at the time. In case of repairs to existing buildings, let the insurance company know before anything is commenced (the builder should be made to insure, so that all risks may clearly fall on him). See specimens of important parts or of things to be repeated, put in place ("offered up" as trials): if you are like other people, you will find the time you spend on a building in progress about the pleasantest you pass.

V. *Misfortunes* (*Dangers to be escaped as far as possible*).—(1.) Damp.—Spend some time, in a locality new to you, in ascertaining how materials have behaved. (2.) Decay.—Go to the quarry if you can, and select the bed, after careful inspection, and talk with the quarrymen: your selection will be made with full knowledge, and you will recognise the characteristics of the best stone as the work comes to the job. Be a little forbearing, if need be, in the matter of evenness of colour in bricks, so long as you get other desirable qualities. (3.) Settlements.—Never neglect an instance of unequal weighting pointed out to you, especially on a doubtful foundation; take precautions at once to broaden the area of support. Attack any crack when it is noticed, and cure it radically,—unless you can explain it satisfactorily to yourself; never let it alone, knowing that it may get much worse, but hoping that it may not. (4.) Delay.—Never let this be owing to the architect. Give out details before they are wanted; select anything required at once on being asked about it; see how much remains to be done, and urge on the contractor, if necessary, by the use of your power of withholding certificates. Frequently the really effectual power of the architect is in his control of the payments. (5.) Many extras.—You will rarely avoid them altogether. Improvements will suggest themselves as works go on; or the employer will have fresh requirements; or circumstances may change radically. Generally, however, avoid serious variations; keep your alterations within the limit of the contract (making a set-off equal to every addition). If possible, have the price for a real extra settled before it is ordered.

VI. *In case of serious Disaster.*—Go to the best friend you have, that can take useful counsel with you; and look the worst possible result in the face from the first.

THE ARTIFICIAL LIGHTING OF BUILDINGS, AND GAS.

IT is a somewhat singular thing that, considering the importance of the subject and the manifest interest of it, so very little, almost nothing indeed, has been said on the artificial lighting of buildings and rooms in an *artistic* sense. If a room be well lighted artificially,—for we propose to speak at present solely of artificial lighting either by gas, oil, or candles, as doing the work of sunlight or daylight,—a good deal of bad and indifferent architecture and furniture is made up for or pardoned, but if badly or vulgarly lighted, which is nowadays almost always the case, the very best of architecture and decoration, and painting and furniture, is artistically lost and even destroyed by its bad lighting up. The subject is just now of more than usual interest from the fact of the "gas strike," and from the singular spectacle of a good part of London, both streets and shops, presenting for a night or two the repetition of what they must have exhibited in the days of our great-grandmothers, before gas was thought of, and long before it was deemed essential to good lighting to abolish *shadows*. The subject is a curious one and somewhat new, and a few words about it may prove useful to some who may not have thought much about it. Putting aside, in the first place, the lime-light and the electric light as exceptional phenomena, we may well say that never before did there exist so intense and sparkling a light as that of gaslight. A street or a room completely lighted by gas jets would have exhibited to our forefathers a scene which would have almost transported them to fairy land; and a theatre lighted up with gas, leaving out the aluminium-wire light, would hardly have been credited. And if our immediate ancestors could but have been bewildered, what would imaginative Shakspeare have thought of such a scene with his own little Globe, or Blackfriars, still in his mind's eye! But yet, if in Shakspeare's day buildings, as theatres, were under-lighted, is it not all but certain that they often are nowadays as much *over*-lighted?

In the first place, it is to be noted that *all* cities, even at this advanced hour of the world's history, are not lighted artificially at all at night; indeed, as we find ourselves in the older places of the world, and in the regions of the almost forgotten, we find, as in not a few of the older Oriental cities, that the moon and stars do all the work of street lighting; and one of the strangest things which the modern traveller has to open his eyes to in them, is the palpable darkness of those towns and cities at night whose very names are to him as enchanted sounds. He finds that if he needs light at night in the absence of a bright moon, he must carry it with him in a lantern, or by a flaring torch. But wholly unlighted towns are soon to be of the past, and where of the present, will doubtless in no short time be among the things that were, and to be *read of*, but not seen. So we may dismiss them, and a good deal with them that our modern light puts out. Imaginatively, it is possible to have too much, even of light. Passing, then, by a few things which need not detain us in the darkness and total absence of artificial light, we come to the dim oil-lamp way of lighting a street, not wholly gone out of sight; for in places at some distance from gasworks it is yet in use, and takes us into the last century fairly. It was and is darkness visible, for the odd-looking lamps, and little oil-flames in them, did but little more than indicate their own whereabouts, and light up a few feet of space round them; yet they did good service in their own day, and fought a fierce battle against gas. It had and has some advantages against gas, for the flame and the light given out from an oil Argand burner are far softer to the eye, and nearer to the colour and effect of sunlight, than is a gas flame, even when the gas is good and pure. It is not pure white light like the electric light that is needed for domestic purposes, but a *softened* light, with yellow rays in it, like those coming from the sun, that is the desideratum. It is well to know, as it at first sight may be a little doubtful, that there are some few London shops in fashionable quarters lighted wholly by oil-flames, and the effect is singularly pure and soft, and does not distress the eye as continued gas-flame does, and as gas is at present burnt. Some of the rooms in the Carlton Club, it may be mentioned, are lighted in this way, and may be compared usefully with the gas-lighted rooms in the same place. No one can fail to perceive the difference, and the more softened effect of the oil-flames.

It is impossible, even in these few thoughts on the subject of artificial lighting, to do less than notice the truly modern, characteristic mode of illuminating the interiors of theatres. It is really impossible to over-estimate the impetus, artistically, that might be given to not a few things,—as *costume*, and even painting,—by a thorough reform in theatrical modes of doing work. We might see in the theatre, as Goethe has observed, what ought, artistically, to be found in real and actual life. There is nothing more humanising or more instructive than a thoroughly good play, well acted, and well put on the stage. We see a little,—and but little, unfortunately,—of this at times; and one of the improvements that might be, as we think, easy of adoption would be in the mode of lighting the interior of a play-house;—both the house itself and the stage as well. As things, for the most part, are at present, the chances are a hundred to one that we have, instead of the scene before us, a gas-burner, or, indeed, it may be, as sometimes it is, any number we can count of them. The interior of the audience part of the house in some of our theatres is so over-lighted as to positively hurt the eye. It is painful to remain for any time in its glare. It seems a perfect deluge of light, and to look on the scene and actors before us is to look out of light into darkness,—by contrast, that is; for the stage and scenery, in reality, are as light as the house itself,—sometimes lighter, as to *kill* the gas in the house the electric light or magnesium-wire light is called in to do that work which even gas cannot accomplish. Surely, the secret, artistically, must be in a subdued light *in the house*, with as few visible barriers as possible, and with the light invisible as to source on the stage, and that light so far under regulation as to imitate, which it well might, the appearance of daylight and sunlight, and thus to help the illusion, and add to the magic of the scene. Next to well-painted scenery, we know of nothing which would so well repay a little thought. Expense it would positively save, for it would save gas. What Shakspeare, with his few dull oil-lamps, or candles, and little stage, and wonderful *minimum* of theatrical "properties," would have thought of one of our great theatres filled with gas-lights all round and about, and everywhere, who can possibly imagine! He himself certainly could not, full of dreams as he was. We forbear to do more than hint at one or two obvious improvements, but can but ask those in authority to think over it, for a world of good might be done by a few well-considered alterations, by putting the bright lights where they ought to be, and putting them out where they ought not to be.

We have instanced more particularly theatres because the effect in them is the more marked, and must strike every one who for a moment gives the subject a thought, but the same remarks apply, more or less, to nearly all public interiors;—gas-lighted cathedrals, churches, chapels, with gas all round, above and below. Why, the very genius of the sombre Romanesque church, to cite but one instance, must be put out, and its very ghost laid, by the staring glare of gas and by the handiwork of the modern gasfitter. Who will try to initiate a better way of things?

But letting this pass, there is one other popular gaslighted place of "amusement," which, perhaps, more than all, needs improvement in its lighting: we allude to the concert-room, such as Exeter Hall, St. James's Hall, and others, wherein the finer sort of music is performed. The subject is not a little curious and scientific. It is a well-known fact, that when one sense is either gone or weakened, other senses are rendered more acute: thus the blind man is commonly found to be more open to the power of sound and music than he who can see; and it is quite certain that the effects of sound and music are more powerful in darkness than in the full glare of day. Humboldt notices this, and Goethe considered it an ascertained fact. Any one can test it by attentive notice of the effect of classical or delicate music, in a dimly-lighted room, as contrasted with the same music in the full glare of daylight or gaslight. The mind is less distracted; the sense of hearing is allowed without interruption to do its work; the eye is at rest, and comparatively unoccupied, and the mind is thus ready to concentrate itself upon the special work, while the ear takes in without distraction or hindrance its own proper harmonies. It is wonderful how much of this may be and is lost, especially in the interpretation of the finer music of sonatas and Beethoven quartets, by this painful glare of over-lighting. We go to hear and not to see, especially as to the works of Beethoven, who, perhaps, alone of all the great masters of musical sound, breathed out his magnificent thoughts in pure sound, deaf and unconscious to all external influences. Pure musical thinking. Nothing surely should be allowed to jar on the sense of hearing, or to distract it. There is one other effect of powerful gaslight among many others that might be cited, that not a few readers must have noticed—we allude to the colour-killing effect which a full supply of gas has upon pictures. We do not here speak of its chemical effect as positively destroying colours; but to the strange power it has in taking the *colour* more or less out of a picture, no matter whether the painting be magnificent in power of colour or not. No painter, whatever his powers, can hope to stand against it. When pictures are lighted with gas it should be done with great discretion.

The Ancient Church of Bradford-on-Avon.—An appeal is being made for funds to complete required works at this building. As the conductor of this journal was amongst the first to make clear the fact that this church is a pre-Norman structure, we naturally feel interested in seeing its preservation, as a whole, made certain.

"I KNOW A HAWK FROM A HANDSAW."

MR. J. A. PICTON has made a suggestion to *Notes and Queries*, touching this much-disputed quotation, which is probably more likely to find favour with our readers than with the general public. The commentators seem to be agreed either that "handsaw" is a misprint for "hernshaw" or that the passage was a familiar proverb already corrupted before it was adopted by Shakspeare. The passage first appears in the 4to. of 1604, and the term "hand saw" is in Roman lower-case in two words, which the writer justly considers evidence against any misprint. Again, if it had been a common vulgarised expression, it would have been found elsewhere.

Shakspeare's illustrations are brought from every ordinary occupation in life, and the building trades have their fair representation. The second part of "King Henry VI.," and the "Midsummer Night's Dream," supply evidence that Shakspeare was familiar with the builder and his tools of every kind. "A handsaw as a builder's tool would naturally fall into a proverbial comparison with another builder's tool, and such we find in the *hawk*, used by the operative plasterer. This is a thin board, about 18 in. or 2 ft. square, held in the left hand of the workman, much in the same way as a painter's pallet, but by a handle or stele on the under side. This holds the plaster of lime and hair which is floated on the wall or ceiling by a trowel in the right hand. The supply of material is brought from time to time by an assistant, called a *hawk-boy*. A proverbial expression, drawn from a comparison of implements used in the building trade, would be very natural. It is equivalent to saying, 'I am no fool, I understand my own business. I know how to discriminate between my own affairs and those of other people.'" There is yet, however, an alternative; for in the Midland counties, especially Oxfordshire, a *billhook* is called a hawk, and this would certainly better compare with "handsaw" than would the bird hawk.

THE ANCIENT DEFENCES OF SOUTHAMPTON.

SIR,—The inhabitants of Southampton should feel grateful for the learned and generally accurate account of their town walls with which your correspondent, "G. T. C.," has favoured them. He has, however, unavoidably fallen into a few errors, which he will no doubt be pleased to have corrected, and he may also be glad of a little additional local information.

1. The Bar-gate was formerly the prison, and the curious cross arches between the centre arch and the side arches probably formed part of the prison arrangements. Bridle-gate appears to have had a similar cross arch.

2. There is no tradition on record of any water-gate to the castle, and the shore at the foot of the walls was flat and shallow, and, except at the highest tides, inaccessible to boats, so that any such gate would have been all but useless. Nor can the water have been deeper when the walls were built; in fact, it was probably shallower, for before the present road was made, the beach had been washed away so as partially to expose the foundations of the wall, and yet the water was very shallow.

3. The projection between the castle wall and Bridle-gate is so weak and slight, and so much out of the line of wall, that it seems to be of more modern construction,—perhaps built when a piece of the town wall fell down.

4. The wall is double, and there are three arches and traces of a fourth south of Blue Anchor-lane postern.

5. The only mutilated part of the passage through West-gate is the centre door-case.

6. The wall south of West-gate does not sink, but continues in a fairly perfect state for eighty yards. At the south end are arches similar to those near Blue Anchor-lane postern. The wall beyond this fell about 1760. There are no traces of a half-round tower in this length of wall.

7. The south or water gate was pulled down about 1803, not 1830—40.

8. The lower part of the old gaol or spur-work appears to be Edwardian; the upper part is a Perpendicular addition.

9. The York-buildings gate is altogether modern. The town-wall was pulled down about 1750, in order to make room for York-buildings. A law-suit ensued, and the present gate was built as a compromise in order to give access from a house on one side to a garden on the other.

C. M.

We have submitted the foregoing to the author of the article, and append his reply:—

Sir,—I feel much obliged to your courteous and well-informed correspondent, "C. M.," for his testimony to the general merits of my paper, and especially for his correction of its errors. I am an absolute stranger to the town, and employed but one afternoon, alone, but with an Ordnance map, in conducting my examination.

The water-gate of the Castle I did not observe, and took upon what seemed to be good positive testimony. To me the broad, flat pilaster seemed never to have been pierced. Nevertheless every castle connected with a town had an independent entrance, and every castle upon water had a water-gate, and at Southampton the two must have been one and the same. Sometimes, as at Ledes, Tonbridge, and the lower postern of Caerphilly, it was so arranged that a boat could be floated in. Sometimes, as at the upper postern of Caerphilly and at Porchester, the boat had to be dragged up.

The light and projecting wall ranging from the south-western angle of the Castle to Bridle-gate, crosses the *embouchure* of the castle ditch upon the sea, and is no doubt in part modern. Possibly it was made salient to enable musqueteers to flank the wall-gate and the curtains. It may be that the water-gate of the Castle was at the mouth of the ditch, into which boats could be floated for a short distance. In that case there would be needed a line of stockade or fence of timber across the shoal-water, as an outwork to protect the approach to the wall from the sea.

I surrender York Gate. I felt that a postern was out of place so near to a main gate, and yet not a part of it.

G. T. C.

NEW LIBRARY BUILDINGS NEAR THE LONDON UNIVERSITY.

A BLOCK of buildings, now almost completed, is in course of erection in Grafton-street East, Gower-street, within a short distance of the London University, and which is intended for a library and an educational establishment in connexion with a bequest made more than a century ago, by a Presbyterian minister named Williams, who bequeathed a large sum of money in trust for theological and academical purposes, together with his library of books and manuscripts, which are of great value. For a number of years past the building for the purposes of the testator's bequest was in Redcross-street, in the City, but the site having been absorbed by the Great Eastern Railway Company, who have had to pay compensation for the same, the trustees purchased a quantity of freehold land in Grafton-street East, and it is on this land that the new building has been erected, and will be ready for opening in the course of a few weeks.

The structure, which has been erected from designs by Mr. Chatfeild Clarke, is in the late Gothic style of architecture, and built of white Suffolk brick, with Bath stone dressings, red Mansfield stone and Forest of Dean stone being freely used in the exterior decorations. The Grafton-street frontage, 80 ft. long and 70 ft. high, consists of a basement, ground-floor, and a lofty story above. The main entrance to the building in the centre of the ground-floor is a prominent feature in the elevation. On each side of the entrance there are three windows, with an equal number of buttresses between them, carried up the whole height of the elevation. The upper story is 30 ft. in height, and contains seven windows, 18 ft. in height to the crown of the arch. The centre window is immediately over the main entrance. The keys and springers to the headings of the upper story windows are in red Mansfield stone, whilst those to the ground-floor windows are in Forest of Dean stone, and all the windows are recessed. The cornice at top of the building is supported by red Mansfield corbels with gauged arches; and the centre of the elevation, above the principal window in the upper story, is surmounted by a gable, enclosing an ornamental circular window, which rises several feet above the rest of the frontage.

A residence for the librarian has been secured immediately adjoining the building, and it is ultimately intended to purchase this property, and erect a new librarian's house on the site.

The basement of the building will contain the kitchen and other domestic offices, together with the heating apparatus, which is being supplied by Mr. Phipson. This part of the interior will also contain strong-rooms, which have been mainly constructed for the safe deposit of some valuable and unusually rare manuscripts forming a portion of the library. The ground-floor will in part be devoted to the educational purposes of the building, whilst other apartments in this portion will be used as committee-rooms, offices, and for other business purposes. The upper story, which may be regarded as the principal portion of the building, and which, as we have already stated, is 30 ft. in height, and extends the entire length of the frontage, will be altogether devoted to the library. This apartment will have a handsome panelled ceiling, with large ribs springing from corbels, and will be fitted with polished wainscot bookcases on each side of the walls in bays. It will be lighted with gas by sun-burners, which are arranged so as to assist in the general ventilation of the building. Narrow flues are introduced between the smoke-flues for the ventilation of the lower stories, and provision has also been made for the admission of pure air under the cills of the windows. That portion of the work in connexion with the lighting of the building and the ventilation is being carried out by Messrs. Richardson, Slade, & Co., of Brownlow-street, Holborn. The cost of the building is estimated at between 8,000*l.* and 9,000*l.*, and Messrs. Perry & Co., of Stratford, are the contractors; Mr. March being clerk of works.

REGENT'S PARK THEATRE.

A NEW theatre is being proceeded with, situate in Park-street, Gloucester-gate, Regent's Park. The principal entrances are in Park-street, Gloucester-gate. Two properties have been purchased for it, making a frontage of 30 ft. and 80 ft. deep.

The façade will be three stories in height, in the Italian style, with columns and foliated caps, which will mark the entrances. The plan includes two entrances, one for boxes, stalls, and first circle, the other for pit; above these are two conservatories or saloons, with glass roof for plants, 50 ft. by 15 ft.,—one for ladies, the other for gentlemen.

The theatre proper is 101 ft. by 69 ft. in width, and is arranged into three tiers. The first tier is reached by a staircase, with sunlights and chandeliers, with a broad double flight of stone stairs outside the theatre at the end of the entrances.

The conservatories are upon a level with the first landing. There are three tiers of boxes on either side of the proscenium, and eight at the back of the first tier, which are raised from the level of the balcony, 2 ft. 6 in., making in all twenty boxes. On this tier there are balcony, stall, and dress circle. The pit will accommodate 1,000; there are four rows of stalls. The two front rows of the gallery tier will be partitioned off for the amphitheatre.

The gas and water patent, as lately, and for the first time, applied at Astley's Theatre, is adopted.

The decorations will be in carton pierre; the ceiling will be arranged with sixteen star-lights in a circle, and cut-glass baskets or chandeliers, with ventilation above.

The gallery entrance is from Grove-street, and upon this site are erected dressing-rooms, and so forth.

The contractor is Mr. Edward Vaughan, Birbeck-road, Kingsland. The decorators are Messrs. Pashley, Newton, Young, & Co., Red Lion-square. The upholsterers are Messrs. Audas & Leggott, of Hull. The gasfitter is Mr. L. D. Berry, Regent-street, Westminster; and the architect is Mr. J. T. Robinson.

LOCAL GOVERNMENT AT BETHNAL GREEN.

SIR,—I beg most respectfully to submit the following for the favour of your consideration,—my apology for doing so being that it is a sanitary question of considerable importance, not merely to the inhabitants here in particular, but to the public generally. Dr. Sarvis, our medical officer of health, states that there are 100 fish-smoking houses in this parish. The largest of these—which is, indeed, the largest in the East-end of London,—is at the rear of Peel-grove, in the midst of four blocks of houses, in the heart of a densely-populated neighbourhood, and its

boundary-wall is not 37 ft. from some of our dwelling-houses. In it are cured, according to the report of our medical officer of health, every night, including Sundays, between 40,000 and 50,000 herrings. Fourteen fires, made from great logs, chiefly the roots of oak and hornbeam, are burning therein at one time, the dense fumes of which roll out in volumes, filling our houses with noxious gases, even when our windows and doors are shut. The louvre-boards from which the effluvium escapes are at the same elevation as our bedroom windows, and there is no chimney-shaft to the factory to carry the effluvium away from our abodes!

Dr. Sarvis warned the vestry "that the smoke would cause irritation of the lungs." Four other physicians, the copy of whose certificates I enclose with this, have certified the smoke-house a nuisance, and greatly injurious to health. Numbers of able chemists in this neighbourhood have affirmed the same thing. The vestrymen having been applied to repeatedly by the suffering inhabitants, have not only persistently refused to abate or remove the pest, but have always avowed themselves the defenders and patrons of it. The reason is that self-interest is far too strong for the poor parishioners to obtain justice, for most of our vestry are related to each other by marriage. They consequently all hang of a string, like one family, forming a gigantic clique, able to crush any movement for the public good that is against their own private interests. In a word, they do just as they like, without any real supervision or control over them. We have also petitioned the Local Government Board, but they declare themselves powerless to do anything except to endorse the decision of the vestry: therefore our health is being wantonly destroyed without remedy, because this is too poor a neighbourhood for us to be able to bear the legal expenses necessary to suppress the nuisance,—which was brought to us, for we did not come to it, and our removing from it would, in many cases, involve the breaking up of our homes and the ruin of our business, with the chance of some other nuisance equally pernicious being brought to us in whatever other place we might remove to.

If this be vestry and Local Government Board management, of what use is either of them to us? So far as our health is concerned, we could not be worse off under Turkish despotism.

R. M. GURNELL.

SANITARY MATTERS.

Conferences.—Lord Leigh, Sir C. H. Adderley, and Mr. Henley, inspector of the Local Government Board, were present at a conference of the sanitary authorities of Warwick on Tuesday in last week. There was a general agreement that medical officers should not have private practice, and it was decided to appoint an officer for each of the two divisions of the county.

A meeting of delegates from fourteen sanitary authorities of the county of Oxford, was held at the Clarendon Hotel, Oxford, on December 14th, to consider the best means of carrying out the provisions of the Public Health Act. A series of resolutions was adopted, the first of which was,—

"That a duly-qualified person shall be appointed to act as Central Officer of Health, over a joint area, consisting of several districts, for the term of three years: Banbury Rural, Banbury Urban, Woodstock Rural, Chipping Norton Rural, Chipping Norton Urban, Henley Rural, Henley Urban, Bicester Rural, Bicester Market End Urban, Thame Rural, Thame Urban, Witney Rural, Witney Urban, and Wheatley Urban."

The chairman said the following sanitary authorities were in favour of it:—Banbury Rural, Woodstock Rural, Chipping Norton Rural, Chipping Norton Urban, Henley Rural, Henley Urban, Bicester Rural, Witney Rural, and Wheatley Urban.

York.—The York Rural Sanitary Board met in the board-room of the York guardians in reference to the appointment of a medical officer and his salary; and of an inspector of nuisances, which had appeared in the *Builder*. The appointment of a medical officer was resolved upon, the salary to be 200*l.*; that of an inspector was postponed.

Typhoid Fever caused by Germ-poisoned Milk. A virulent outbreak of typhoid fever in several streets near the Leeds townhall, a few weeks ago, attracted the attention of the authorities. The epidemic, very fatal in its character, pursued a somewhat eccentric course. It attacked families in some parts of fashionable squares, and left others untouched. It raged in certain middle-class houses in the same street, and passed over others. Though it was found that the drainage in some parts of the affected districts was slightly defective, this did not satisfactorily account for the attack. The authorities next turned their attention to the food supply of the infected houses, and they then discovered that one milk-dealer living in the centre of the town supplied the whole of the infected houses, and it transpired that he received his daily quantity from a farm near Harewood. Thither the health officer of the town at once proceeded, and found that some six persons were there suffering from the fever. The milk-cans were generally kept in the kitchen, which closely adjoined the room where the fever patients were lying, and one woman attended both to the sick inmates and to the dairy. The theory is that the germs of disease in the air settled down in the milk-cans before they were daily sent out with their stock. The sanitary committee of the Leeds town council at once stopped the sale of milk from this infected quarter. To show the severity of the epidemic it may be stated that some eighty people have been thus attacked, and that twelve died.

Typhoid Fever at Birmingham.—The alarming prevalence of typhoid fever in the district of Balsall Heath and Moseley, suburbs of Birmingham, has led to the holding of a public meeting of the inhabitants of Moseley. It was stated, on eminent medical authority, that there were nearly fifty cases of fever in the four hundred houses which are comprised in the district of Moseley, and that there were at least thirty cases in Balsall Heath, the district adjoining. Fresh cases were occurring every day. The sanitary precautions were characterised by a leading local surgeon to be as defective as they could be. There was no drainage worthy of the name, and the cesspools and waterclosets caused incalculable mischief. A member of the local sanitary authority was present, and defended the course of action taken by that body. A resolution was adopted by a large majority, appointing a committee of residents to deal with the matter, and directing that a memorial be forwarded to the Secretary of State, praying for a special commission to inquire into the bad drainage of Moseley. A guarantee fund was subscribed, and a movement fairly set on foot to deal with the evil.

SCHOOL BOARDS.

Carlisle.—After an adjournment from the hall to the committee-room, the Board proceeded to consider the various plans which had been sent in for the new schools proposed to be built. After a very brief conversation, preference was given to two sets of plans—those of Mr. D. Birkett, of Carlisle, and those of Messrs. Scoles & Cory, London. Canon Curry said he had inquired and found that the latter plans could be carried out for 1,800*l.* After considerable discussion, and examination of the plans, Mr. Wrigley moved that Mr. Birkett be the architect, the Board having previously decided not to pledge themselves to any of the plans as they were presented. Another conversation ensued, and at length it was decided, on the motion of Mr. Crowder, seconded by Canon Curry, to postpone the consideration of the plans till next meeting.

Barnstaple.—Mr. Neill moved:—"That the tender of Squire Holdsworth for the erection of a school on the Barker-end site, amounting to 9,866*l.*, be accepted." He observed that they had two sets of tenders in respect to these schools. In the first instance Messrs. Wilson's was the lowest, and Mr. Holdsworth's next; but after the plans had been revised, Mr. Holdsworth's was the lowest. They had dispensed with the tower and several other matters which were considered expensive had been taken away. Carried without opposition.

NEW NATURAL HISTORY MUSEUM, SOUTH KENSINGTON.

As promised with the view in our last number, we publish this week a plan of the ground or principal floor of the new Natural History Museum about to be commenced at South Kensington.

The level of this floor is several feet above that of the surrounding streets, and as the latter are several feet above the general level of the museum site, a basement story entirely above ground has been arranged, containing towards the front several useful suites of curator's rooms and workshops, and towards the back, store-rooms, kitchens, &c.

The principal floor is approached by a curved incline for carriages, entered by two gateways in Cromwell-road, and by a broad central flight of steps for visitors on foot.

Passing through the great archway of the entrance, 40 ft. wide, we reach a hall, 170 ft. long by 97 ft. wide, consisting of what may be called a nave, 57 ft. wide, and recesses on either side, devoted to exhibition wall-cases.

The main staircase from the principal to the first floor, consisting of flights of steps 20 ft. wide, is placed at the northern end of the hall. The staircase leading from the first floor to the galleries above, spans the southern end of the hall, on an elliptical arch.

The hall will not only give ready access to the various portions of the Museum, but will itself afford, in the recesses on either side, large accommodation for exhibition purposes. It is intended that this part of the building shall be devoted to an index or typical museum, containing specimens of a more popular character, and, together with the Museum of British Natural History at its northern extremity, be lighted by gas and thrown open to the public during the evenings. For this purpose the doorways leading from the hall, or Index Museum, to the eastern and western portions of the building, will be fitted with fireproof doors.

To the right and left of the Index Museum, facing the south, on the principal floor, are two side-lighted galleries, each 278 ft. in length by 50 ft. in width, terminating in the pavilions at either end of the main front. The cases in these galleries will be placed between the windows, and extend from the side-walls to the coupled columns (cast iron, cased in terra-cotta) supporting the floor above, the space between the two rows of columns being devoted to passage-way.

There will be three stories of these side-lighted galleries, those on the principal and first floors being precisely similar in arrangement, and those on the second floor being partly lighted by the dormer-windows and partly by roof-lights.

Behind the two south galleries on the principal floor the plan shows, on the west side, three large galleries, 39 ft. in width by 160 ft. in length, for immediate erection, lighted by continuous roof lights at the junction of the roofs with the walls. Between these top-lighted galleries are galleries reserved for the study and preservation of duplicate specimens. The cases for the exhibited specimens will be placed between the piers, and separate the public galleries from those devoted to students. They will form a continuous line towards the former, and where they are required of extra depth for the larger specimens, they will project on the students' side.

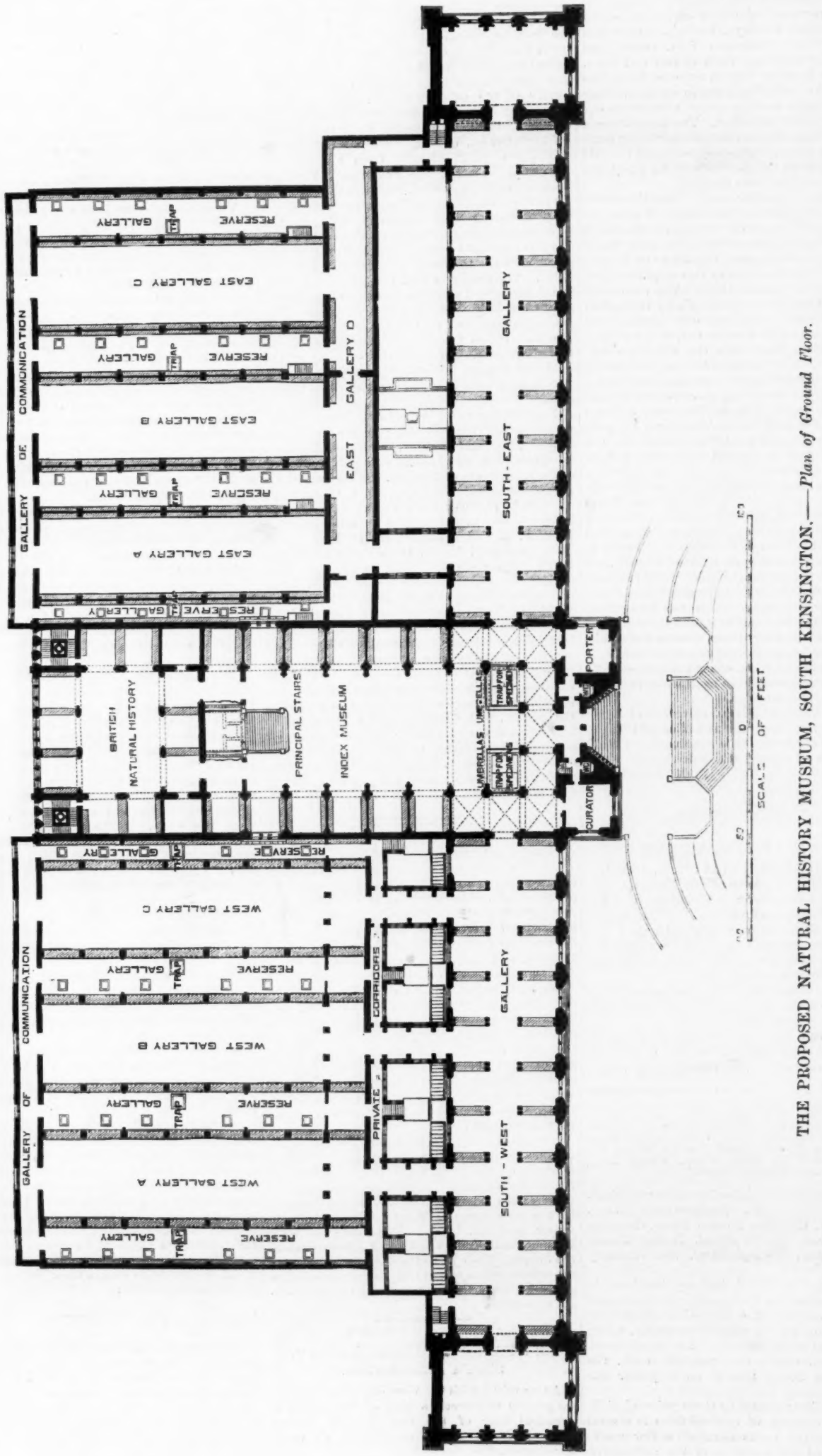
The reserve galleries communicate by trap-doors, with the storerooms below. The workshops and studies in the basement may also be reached by a staircase across a private corridor, from the reserve galleries.

A slightly different arrangement of top-lighted galleries on the eastern side has been adopted in order to meet the views of those who are likely to have the custody of the collection there.

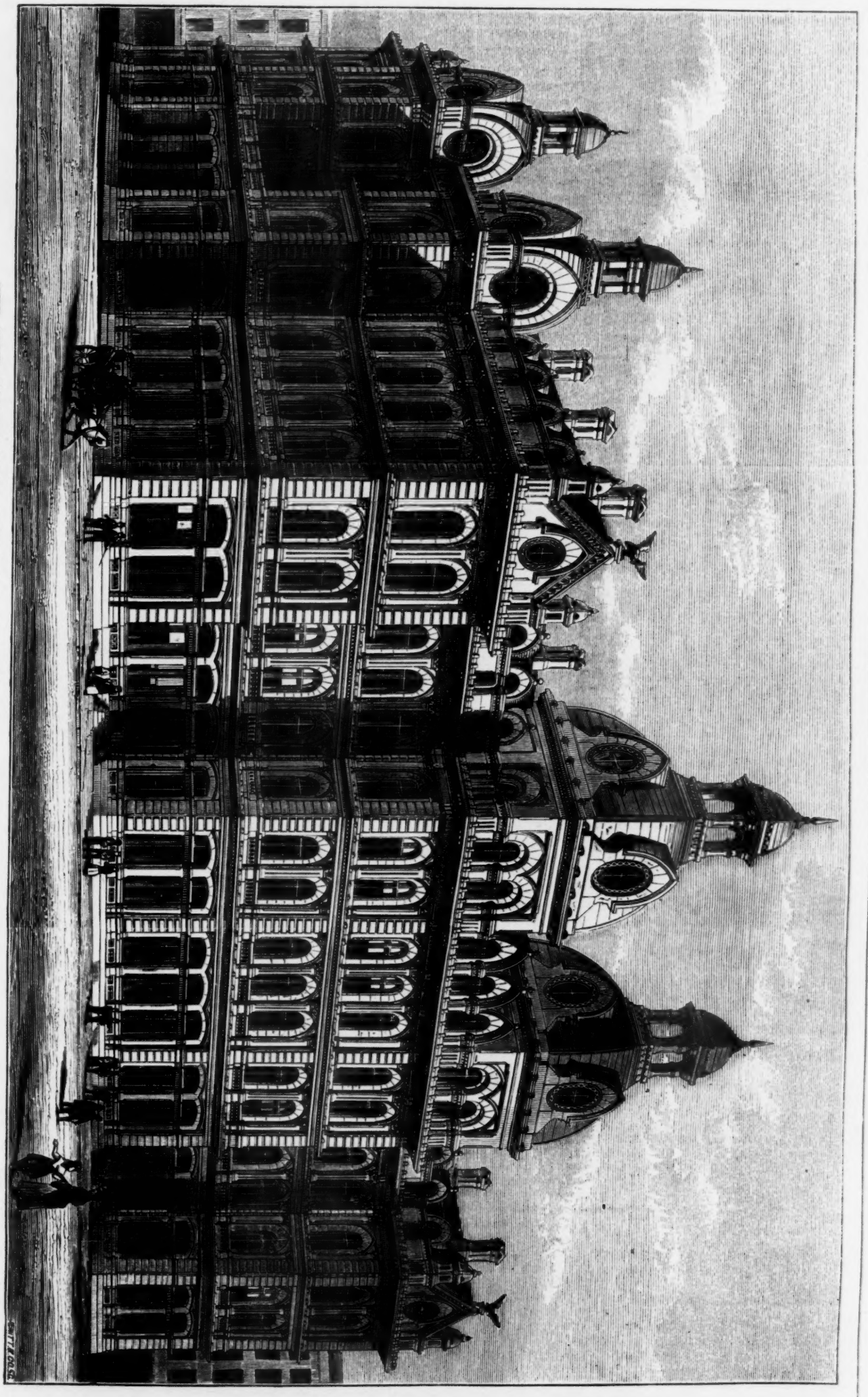
Generally speaking, it is intended that the zoological collections shall be placed on the western side of the building, and the geological and mineralogical collections on the eastern.

As the Museum progresses we may have other opportunities of publishing further descriptions of its construction and arrangement. Mr. Waterhouse, from whose designs, as our readers know, the building is about to be erected, has given much thought and consideration, in conjunction with the officials, to ensure the efficiency of the general arrangements.

Monumental Sculpture.—The execution of the memorial cross intended to be placed over the tomb of the late Sir H. F. Lambert, bart., in the Malvern Cemetery, has been entrusted to Mr. W. Forsyth, sculptor. The monument has been designed by Mr. Preedy, architect, London. The cross itself will stand 15 ft. high, upon two massive granite steps. The base, cross, and shaft will be of white Sicilian marble, with inlays of serpentine in the centre of the cross, and the sacred monogram.



THE PROPOSED NATURAL HISTORY MUSEUM, SOUTH KENSINGTON.—*Plan of Ground Floor.*



THE NEW GOVERNMENT BUILDINGS, CHICAGO, U.S.—DESIGNED BY MR. A. B. MULLET, ARCHITECT.

THE NEW GOVERNMENT BUILDING, CHICAGO, U.S.

THE rapidity with which Chicago has been reconstructed has astonished all beholders. About 1,500 buildings, public and private, have been erected since the fire, many of them of great size and cost. Amongst those now going on is the structure of which we give a view. It will occupy the square bounded on the north and south by Adams and Jackson Streets, and on the east and west by Dearborn and Clark Streets, known as the Bigelow Block. The plan of the building measures 342 ft. 6 in. by 210 ft. 6 in., and is placed in the centre of the square. To avoid monotony, the plan is boldly treated with projections, and in the elevations there are important central features on each façade carried above the main cornice as towers, each surmounted with a domical roof and belfry-shaped termination in stone. The style adopted is a sort of Romanesque, treated very freely, not to say disguised. The corners are heavily rusticated, and the wall surface is relieved by piers, with carved capitals. The first story is treated with the segmental arch. A bold transom, carried throughout continuously, adds to the solidity of this story, and prevents any appearance of attenuation, which the piers otherwise would have. The post-office requirements for light are such as to make it a difficult problem to solve, in giving up all wall space for glass, not to destroy the architectural effect by an unpleasant feeling of the slightness of support for the superstructure.

On each of the shorter sides is a capacious porch; on the long sides are entrances to the various departments. The second story (or "first floor") has an ornamented pedestal course, through which will be admitted air for ventilation. The windows have semicircular heads, with pointed Italian arch mouldings above. The various stories are well defined by broad belt courses, simply decorated. The main cornice carries a balustrade at its outer edge, and its great projections are sustained by brackets. The part above the main cornice is treated in an original manner, whereby a good story is obtained. The details are well studied.

The first story and basement are for the post-office business entirely. The second story will be used by the sub-treasury and the customs; and the third story will be devoted to the Law Courts.

The general plan of the building comprises an interior court, 83 ft. by 198 ft., open to the ceiling of the first story, which will be a glass skylight, lighting the working part of the post-office. In the upper stories a continuous corridor makes the circuit of this court, and all the rooms are lighted from the outside walls of the building. The vaults will be carried through each story in solid masonry from the foundation. At each end of the building will be two passenger lifts, besides a fine airy staircase. The ventilation of every part is well cared for.

This structure will be erected under the supervision of Mr. James C. Rankin, architect (who resigns the position of Assistant Supervising Architect of the Treasury Department for that purpose), from the designs of Mr. A. B. Mullet, supervising architect of the U.S. Treasury, at Washington.

AN OLD BRICK HOUSE IN ENFIELD, MIDDLESEX.

THE Great Eastern Railway Company, having built a new station at their terminus at Enfield, are about to pull down an extremely interesting house, of the Queen Anne period, which has hitherto served the purposes of a station. The front of the house has good specimens of carved and moulded brickwork. The central portion of the front is, perhaps, one of the finest pieces of English brickwork in existence. It consists of an elaborate entablature, with a segmental pediment, and four pilasters, which divide the front into three spaces, the central space, which contains a large window, being twice as wide as the lateral ones, each of which contains a niche, semicircular on plan, with a semi-circular head, filled in with a well-carved cherub's head. Above the niche is a panel containing swags of fruit and flowers, well carved out of brickwork. The entablature is very elaborately moulded and carved, the cornice having delicately-moulded dentils. Each pilaster has a carved composite capital. The bricks of which this portion of the front is formed are small and the joints almost imperceptible. All the carving is out of the solid brickwork, and none of this work appears to have been cast. The front contains, in addition, four windows, with carved brick architraves and label-heads: the other features are the usual ones found in houses of this period. The plan of the house is ⊓ shaped. All the rooms are panelled.

A view of the front and a carefully-measured drawing of a specimen of the carved, moulded, and rubbed brickwork, by Messrs. Penstone & Batterbury, were published in the fifth volume of the Architectural Association's sketch-book.

It is a great pity that so good a specimen of a house of the period should be destroyed. It is said to have been inhabited by one of the Earls of Essex. Enfield has many old and curious houses; but this one is its most perfect and best example. A correspondent suggests that the authorities at the South Kensington Museum might preserve the central portion, and asks the London and Middlesex Archæological Society to see what they can do towards saving it: otherwise the house is doomed to be destroyed in a few days by Messrs. Patman, builders, of Enfield.

NEW CATTLE-MARKET AND PUBLIC WORKS FOR DUNDEE.

A NEW cattle-market and abattoirs, on a large and comprehensive scale, are proposed to be constructed at Dundee. It appears that Mr. Markison, the town surveyor of Dundee, has recently visited London, Deptford, Liverpool, Manchester, and Paris, and personally examined the markets and abattoirs recently erected in these several places. The result of these visits and inspections is that he has just submitted plans to the corporation for the erection of a new market of this character in Dundee. The extent and magnitude of the proposed market may be conceived when it is stated that, exclusive of the boundary streets, the site of the proposed market embraces nearly nine acres, and the total estimated cost of the works, including market, hotel, stables, offices, and market erections of various sorts, lairs, and lines of railway, is nearly 50,000*l*. In addition to this new market, extensive new waterworks are also about to be constructed, at an outlay of more than 30,000*l*.; and beyond these undertakings, both of which are proposed to be carried out by the local municipal authorities, a scheme has been put forward for the construction of a high-level railway around the town, with a view of reducing the heavy cartage from the railways and docks, and facilitating the traffic of the mills, manufactories, and engineering establishments. It is further stated that the project has the warm support of both the Caledonian and North British Railway Companies, who are prepared to subscribe towards the undertaking.

WORKS AT SALFORD.

Stowell Memorial Church Schools. — These schools were formally opened on the 2nd inst. They form the concluding part of the scheme, designed as a memorial of the late Canon Stowell. They are situated near Regent-road, and are bounded on all sides by streets. The site contains 2,420 square yards, of which about two-thirds are devoted to playgrounds. There are two school-rooms, one being 60 ft. by 30 ft., and the other 59 ft. by 20 ft. In connexion with the latter, is a class-room, 18 ft. by 20 ft. The roofs are of high pitch, and open to the collar-beams. A care-taker's house is also provided. The building is of a plain but substantial character, faced with white headers, and having stone and stock brick dressings. They have been erected in accordance with the requirements of the Education Department. Accommodation is provided for about 400 children, who will be taught in mixed classes. The total cost, exclusive of the site (which has been given), is about 2,290*l*. The builder is Mr. Geo. Napier, Hulme; and the architect is Mr. John Lowe, of Manchester.

Stowell Memorial Church.—A reredos, from the designs of Mr. John Lowe, has recently been erected in this church. It is of varied stone, enriched with marble, and extends the whole width of the chancel. The lower portion is of Darley Dale stone, and the upper of Caen. This upper portion consists of five gableted panels, the three central being so combined as to form a centre-piece. The panel-shafts are of red granite, relieving the white Caen, and supporting pointed arches, having also carved caps. In the centre of each panel is a raised field, with carved emblems (*e.g.*, wheat, vine, passion-flowers, &c.), and bearing appropriate inscriptions. The tympanum of each gable is a diapered surface, of Styperson stone, in the centre of which is a circular panel of Caen stone, enriched with various coloured marbles. Crocketed pinnacles separate the gables (which are also crocketed), and all terminate in carved finials. The whole is the gift of a lady, in memory of two friends of the late Canon Stowell. The builders were Messrs. Ellis & Hinchliffe, of Manchester.

PUBLIC WORKS IN WASHINGTON.

A FLOWING account of the great changes in the streets of Washington made under the Board of Public Works is given in the *New York Times*. The great width of the roads was found a difficulty:—

"The plan of Washington, as laid out by its founders, contemplated a city with millions of inhabitants. There is more area in the streets and alleys of the city than there is devoted to the uses of public and private buildings. In Paris the ratio of street area to the area of the city is 25·8 per cent.; in Vienna, 35·8; in Boston, 26·7; in Philadelphia, 29·8; in New York, 35·3; in Washington, 54·5. The report says:—

'How to improve these very wide thoroughfares, interspersed with numerous reservations and public squares, without bankrupting the people, was the practical question which had first to be solved. The most feasible plan suggested was so to narrow the carriage-ways as to render the use of improved pavements practicable. This would place the surplus width inside the footwalks, where it could be parked and otherwise beautified at slight expense to the public, and in many instances at the expense of the property bordering upon it, the owners of which, for the privilege of the use of the ground, would gladly beautify and adorn it. By this plan, that which was a barren and unsightly waste has been made a beautiful feature in the contour of the streets and avenues. The cost has thus been very largely reduced, while the capacity of the streets as a means of intercourse has not been in the least abridged.'"

It is stated that the Board of Public Works have succeeded in getting work done for 50 per cent. less than the same work is done for in the cities of New York and Brooklyn. The identical pavements which have cost New York 5 dollars per square yard are being laid here for 3 dollars and 3 dollars 50 cents. This result has been achieved by a determination on the part of the Board, at the outset, that it would be better to establish a scale of prices at which work should be done, and to award contracts at these uniform prices to responsible persons. The plan is said to have worked exceedingly well.

"BRICKWORK AND MASONRY IN IRELAND."

SIR,—From the speech of Mr. Owen, the president of the Architects' Institute of Dublin, quoted by you, any person would be inclined to think that the Irish granite was an utter failure. Such statement, made by the president, is certainly not very patriotic, to say the least of it, and shows how little Irishmen are acquainted with the produce of their own beautiful country. I shall attempt to do that "justice to Ireland" which it would appear is not obtainable by "home rule," if such can be applied to the statement made in Dublin.

No country can produce a better granite, not only useful but ornamental, than Ireland; the beautiful Aberdeen granite cannot even compare with the splendid granite produced at the model temperance town of Bessbrook. Here is a granite unsurpassed for quality and beauty; only see the monuments erected by Farmer & Brindley, of the Westminster Bridge-road. Again, see the works of Burke & Co., of Regent-street; also of M. W. Johnson, Sanders, & Co., and Maile, the monumental masons, of the Euston-road, and compare with the statement made in Dublin. I positively assert that a more useful, more durable, and at the same time ornamental granite than that of Bessbrook has not yet been found. I have had the pleasure of visiting this temperance town, and can most truly state it to be a model town. It really appears as one large happy family, and the secret of it all appears to be that the whole management is under the control of the Bessbrook Spinning Company, a company composed of gentlemen whose main object appears to be the welfare of the population. The granite quarries were opened by them, and are worked with the object of providing employment for the male population of the town, and, so far as quality of granite is concerned, they have it unsurpassed. At very great cost they

have erected machinery to facilitate the working (but whether or not such will be found advantageous to a granite quarry remains to be seen); they have applied water-power for polishing the granite, and have produced some of the finest possible specimens of polished granite monuments, and likewise building materials, to the satisfaction of the most eminent London architects. Therefore, am I not justified in requesting you to allow such facts to be made public through your most useful paper, after the sweeping condemnation of Irish granite which has appeared? and more especially when I state that I do not write as a novice in such matters, having had an experience of over thirty-five years in granite. AN ENGLISHMAN.

*** We have received several other communications on the same subject, including a copy of a letter addressed to the president of the Institute of Architects of Ireland. The writer of the latter says, in the course of it,—"The Bessbrook granite combines beauty and durability in so high a degree that the astute Scotchmen themselves already recognise the fact, and apply to us for blocks to be wrought, polished, and sent forth into the market as Aberdeen granite. In some cases we supplied these blocks, but have now ceased to do so, knowing no reason why Scotland should win fresh laurels at the expense of Irish reputation." Mr. Owen has since written to say that his thoughts were fixed solely on Dublin, and that he did not wish his words to extend to a wider district.

THE FOREIGN COAL AND IRON TRADES.

THE French iron trade continues quiet, but there is a general impression that it will shortly bedome more active. Orders have declined in importance. MM. Blondeaux & Co. have obtained a contract for 3,000 tons of rail for the Northern of Spain Railway, at 12*l.* per ton, delivered at Antwerp. The exports of iron from France in the first ten months of last year are returned at 216,000 tons, as compared with 187,000 tons in the corresponding period of 1869. The Belgian iron trade has exhibited rather more firmness. In the Belgian coal trade, notwithstanding some temporary traffic difficulties, prices remain firm, orders being abundant. The exports of coal from Belgium in September have been just officially returned at 440,877 tons, or 23,217 tons more than during September, 1871, and 296,881 tons more than during September, 1870. It appears that 401,450 tons were exported from Belgium to France. Coal maintains its price firmly in France.

An important discovery, according to the correspondent of the *Swiss Times* at Milan, has been made within the past month by Signor Ferrero, an amateur chemist, who for many years has made a special study of combustibles. He has succeeded in the invention of a substitute for coal, the quality of which renders it most serviceable for machine and locomotive consumption and the extraction of gas, the refuse being economised into a sort of coke for kitchen use. The process is exceedingly simple, and makes use of a raw material extremely abundant in Italy, whose combustible, gaseous qualities were unknown or unapplied until this invention. The cost of this new fuel will not exceed two lire per hundredweight.

A MODEL HOTEL ABROAD.

As your paper has been for years, and is still, the medium of numerous sanitary discussions, I thought perhaps the following might be a little interesting, as showing how these matters are conducted on some parts of the Continent.

I speak of a large and well-situated building, overlooking one of the finest valleys in Europe, the resort of numerous English and American travellers, and holding a primary position in the guide-books referring to the town in which it exists.

The building in question entirely surrounds a court-yard, and is annexed to some other buildings of the same height and width; the court (some 50 ft. square) is entirely and completely covered over with glass, without one particle of ventilation or opening of any description, and is, in fact, to all purposes hermetically sealed. The kitchen and four stories above being next to the adjoining building, have no other frontage except into this covered court, the door and windows opening into the same! Corridors surround the yard, leading to the different rooms, also having no other opening save this: untrapped drains are below; and yet there is not one breath of ventilation.

A large staircase ascends to the different rooms in one corner of the court, and has no other opening of any description, save into the corridors. Dark and gloomy is this staircase, and the stenches from below are horrible and offensive: the disgusting gases from the drains rise up here, and hang in the corridors above, having no outlet whatever to dissipate them. To open the windows is only to let other stenches in, which have accumulated from the cesspools below, and which hang in one vast body under the roof, and yet there is not one breath to carry this away.

In times of much rain, the horrible gases are driven up the drain into the corridors above, and are diffused throughout the house. Nor is this all, for the smells from the kitchen having no outlet whatever except into the court, rise up under the roof, mix with the smell from the drains, and assist to make the whole doubly more sickening.

I simply send this to the sanitary world as a curiosity, and without one letter of exaggeration.

The covering over of the court, without ventilation, I have also noticed in Vienna and some parts of Italy, in new and public buildings.

Travelling as an architectural student, the more I see of these matters the more sure do I feel that they are too often overlooked by us. Architectural lectures do we attend, relating to the different styles, perspective, projection of shadows, or even carpentry and mechanical drawing; but little do we hear or know of sanitary matters.

Any meetings connected with architectural students relating to these matters I should most gladly avail myself of on my return to England, and would readily give notes of any incidents concerning the same coming under my notice between now and then,—not as suggestions for future improvement, but as examples of what to avoid. ALBERT N. BROMLEY.

Venice.

EXPLORATIONS AT THE SUPPOSED SITE OF TROY.

DR. HENRY SCHLIEMANN has sent to the *New York Herald* a paper in which he gives the results of his labours and researches on the site of Troy, where he has been at work for several years. At only one mètre below the surface, he says, I came upon a relic of Greek art, a fine sculptured marble of the time of Lysimachus, representing Phœbus Apollo in female attire with the disc of the sun on his head, and supported on four horses of beautiful workmanship. I also found there a long Greek inscription, which I shall publish, and which refers to the Emperor Antoninus Pius, who is therein called Titus Ælius Hadrianus Antoninus. At this part of the mount the accumulation of rubbish is very great. I came upon a wall built of huge stones, joined with clay. Whether this wall served as the substructure of some Trojan temple, or whether it was the wall of circumvallation which Homer ("Iliad," vii.) attributes to Neptune and Apollo, I am unable to say. Below and above this wall I find masses of that splendid black pottery which resembles so much the Etruscan terra-cottas. My thoughts are now absorbed in another important object. In digging the great trench simultaneously from north and south across the mount, I came, July 19, upon a colossal structure of solid masonry, 12 mètres or 40 ft. in thickness, and of a perpendicular height of 6 mètres (20 ft.), built on the primitive rock. Its structure is similar to that of the wall found beneath the site of the temple, except that the stones are smaller. I find by measure that the part I have laid bare is but 37 or 38 mètres from the western descent from the Acropolis to the plain, and it is, therefore, not unlikely that the structure was a tower in the wall, and it may have been the great tower of Ilium ("Iliad," vi., 386), to which Andromache went up to scan the plain in search of Hector. . . . On the primitive soil I found a Trojan lamp. I also found on the virgin soil a small domestic burial-place, formed by three stones, and containing two urns with human ashes. In the Trojan ruins proper I found weights of granite, hammers and axes of diorite, and small, beautifully-polished implements in the form of wedges of a splendid transparent green stone, besides small black terra-cotta discs, &c. Until last week the only Trojan symbol I had found in all my explorations was the sun. But last week I found a large number of symbols which enable me to say with certainty that the Trojans were Arians. The cross, and that cognate symbol which may be described as a cross with a crotchet at the end of each limb at right angles with the limb, are the symbols of those two pieces of wood which our Arian forefathers used, together with the "pramatha" (from which the Greek Prometheus), for kindling the holy fire (agni). The crotcheted cross symbol was found on utensils discovered on the banks of the Oder, and is a symbol of great importance in religious history.

SIR ARTHUR HELPS ON ART.

THE distribution of prizes to the successful students at the Portsmouth School of Science and Art took place in the Green-row Rooms, Portsmouth, on Monday evening in last week, in the presence of a crowded audience. Ex-mayor Ald. S. Baker presided, supported by Sir Arthur Helps, Mr. Stone, M.P., and members of the committee. After a preliminary statement by the Vicar of Portsmouth, chairman of committee, showing that the students had been very successful,—

Sir Arthur Helps addressed the meeting. He referred to the great enjoyment following school studies. It was a celebrated saying of Charles V. that "He who knows two languages is twice a man," and similarly he would say he who knew any other art besides his bread-getting one was twice a man. Speaking of the intellectual advantages the students gained, the first that struck him was the increased power of observation. He had once made the rather venturesome observation—to which he adhered,—that no one had really grasped and mastered a thing unless he had had to depict and describe it. Then there was the advantage of accuracy,—a sort of plebeian virtue. No! it was not common enough in the world. Would that it were common enough to be called plebeian! He believed that all the intentional lying in the world—of which there was a good quantity, perhaps,—did not do one quarter of the mischief that inaccuracy did. If a superior being were to come to him and ask him whether he would rid the world of inaccuracy or lying, he would say, "Let us get rid of inaccuracy,"—the misrepresentations, misunderstandings, misquotations, and all those things which led to the most tremendous quarrels between man and man, and nation and nation. There was not any method by which they could conquer this inaccuracy better than by the studies they were pursuing. Another intellectual advantage resulting from these studies was, that they gained power of expression. He believed that very low down in the world very great thoughts existed, but lacked expression. The students were also gaining power of representation in depicting nature. Replying to the arguments of those who asked how it was that the decadence of a State had generally begun when art was at its best, he maintained that the assertion implied was a total delusion. There was an enormous distinction between luxury and art. Nations had fallen, it might be, through luxury, but not through art.

ACCIDENTS.

Fall of a Floor in Sheffield.—The floor of a shop in Pondhill has fallen in. Between the shop and the next house there is a passage from the street, by which the back of the houses is approached. For some days before workmen had been engaged digging up the passage for the purpose of laying a drain-pipe, and a depth of about 5 ft. was reached. At this depth, the foundations of the houses on either side were exposed, and it is believed that this was the cause of the accident, for the foundation of the shop suddenly bulged out. This caused a portion of the outer wall to come down, and with it fell the roof of the cellar and the floor of the shop above. A girl was injured, and a labourer received a rather severe scalp wound. At the time of the accident, the required depth had been reached, and a portion of the drain-pipes were laid.

Fall of a Floor in Cornwall.—During a tea-meeting, which was held at Charlestown, Cornwall, on New Year's night, half of the floor of the large volunteer drill-hall, in which the company were assembled, gave way suddenly. Sixty persons fell into the cellar below, a distance of

16 ft. Fortunately the cellar was used for storing china clay. The audience who had escaped the accident were unable to descend the staircase, as it was that end of the building that had fallen, and they were in momentary expectation that the remainder of the floor would give way. The vicar was the first to make his way out of the cellar, when he immediately, with the assistance of others, secured planks, and placed them across the aperture in the floor. The persons in the cellar were then pulled out. The injuries sustained were broken bones and severe contusions. The remainder of the audience had to get down by ladders and planks.

Fatal Accident at the Alexandra Palace.—Mr. Richards has held an inquiry at the Nag's Head, Tottenham, respecting the death of George Hines, aged forty-two years. It appeared from the evidence that the deceased was foreman of a number of men engaged in the building of a theatre at the Alexandra Palace. On Saturday before last he was hoisted a distance of 95 ft. to fix some poles in the roof of the theatre, when in commencing his descent he missed his footing, and fell to the ground. He expired in about seven minutes. The jury returned a verdict of accidental death.

THE THAMES EMBANKMENT.

LAST week a deputation from the vestry of the Precinct of the Savoy waited upon the Metropolitan Board of Works in order to present a memorial upon the subject of an approach from the Strand through the Precinct to the Victoria Embankment. The memorial set forth that the only means of communication between Villiers and Surry streets, a distance of 710 yards, was by means of the steps at Waterloo Bridge, only practicable for pedestrians. The want of a thoroughfare for carriages was producing serious injury to commerce, property, and public convenience, and the present limited use of the Embankment between Westminster and Blackfriars was in a great measure to be attributed to the few approaches to the Strand from the Embankment. The deputation proposed the construction of a road 60 ft. wide through the Savoy, appropriating a very small portion of the Thames Embankment Gardens, and using some vacant property of this Board. Mr. White having expressed the views of the deputation, Mr. Newton asked Mr. White if he had not been to the Board before opposing any road through the Savoy, and whether in consequence of the opposition the Board had not abandoned the viaduct. Mr. White said that was so, but the road was different altogether to the plan now proposed, which would cost 100,000*l.* instead of 300,000*l.*, and lead down to the Embankment by an incline of one in twenty. On the motion of Mr. Phillips the matter was referred to the Works Committee.

DEPRIVATION OF PROSPECT.

Robinson v. *Grave.*—In this case, before Vice-Chancellor Wickens (Dec. 18), plaintiff, in the spring of 1852, contracted to purchase from the defendant land near Derwentwater, from which there was a fine view north and east. Plaintiff then built a house, the defendant having known, at the date of the contract, that this was his object in buying the land; and in 1854 the land *and house* were conveyed to the plaintiff. The defendant shortly afterwards obstructed the view from the plaintiff's windows looking north and east, with the intention of preventing his acquiring any rights under the Prescription Act. Plaintiff filed his bill to restrain such obstruction.

Vice-Chancellor Wickens, without hearing a reply, granted the relief prayed.

WORKING MEN'S COLLEGE.

THE inaugural address at the commencement of the winter session of this college, in Great Ormond-street, has been delivered by the Dean of Westminster. There was a large attendance of students and visitors.

Mr. Thomas Hughes, M.P., in the absence of the Vice-Principal (the Rev. J. S. Brewer), took the chair, and referred to the great loss which the college had sustained by the death of its founder, the Rev. F. D. Maurice.

Dean Stanley, who was warmly greeted, said there was a very widely-spread complaint or murmur, he could hard call it a belief, that the age for individual influence had passed away, and that the world was henceforth to be guided by general movement—by the action of masses, forces, or parties of men. Against that complaint the connexion of this college with its first founder was a perpetual protest. At the close of his address, the Dean said he thought he had said enough to show that they need not give way to the popular belief that the age for individuals and institutions had passed.

In the course of the evening a report was read by the secretary, which contained the following passages:—

"6,144 members have joined the college to this date and at least double that number have passed through the adult school. In the college 573 members attended classes during the past year. There was an increase in the average number of men attending the higher sections in all divisions, with a decrease in the number of men attending the elementary sections, especially so in English and French. . . . . There is still a sum of about 220*l.* due for repairs on account of the new building, &c., and at the close of the year there was a balance against the college of 40*l.* . . . . . The experience of the college makes it reasonable to expect that, when it is freed from its temporary incumbrances, it will easily support itself without any extraneous aid."

CLEANING FLAGSTONES.

IN reply to "G. W," it will be necessary to take up the flags and relay them, after cleaning, on dry ballast, free from mould, and a superstratum of chalk or old clean dry mortar.

To clean the stones, lime-white them both sides with hot new-made lime-wash, and brush it off when dry; and repeat the process if necessary. This process is also applicable to any old building material that cannot otherwise be cleaned; for old brickwork or stonework of any kind; and also for dirty old wood floors. These latter only want one thin coat, and should be scrubbed as soon as the lime is dry. In this case the lime does good in every way. Where necessary it removes contagion, kills vermin, purifies the atmosphere, and cleans and preserves the wood.

WALTER SCARGILL.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

ON Saturday last, the members of this Society again visited the extension works of the Great Eastern Railway, between Broad-street and the low-level station at Shoreditch.

The members assembled at Broad-street Station, North London Railway, at two o'clock, and were conducted over the new works by the representative of Messrs. Lucas, Brothers, the contractors.

The works in this section of the railway consist of the new station and approaches, and a short length of line between retaining walls.

A notable feature is the subway for the mains of the Chartered Gas Company, running under the whole width of the station parallel with what was Sun-street. The roof of the subway under the platform is formed of brick arching; but under the line of rails iron girders will be used.

The Shoreditch Low-level Station claimed the attention of the members. The roof of iron and glass is light and elegant, and the ventilation seems satisfactory. The iron bridge carrying Commercial-street over this station was particularly noticed. The works, which are in a forward state, are being carried out under the direction of the company's engineer, Mr. Edward Wilson.

THEATRICAL.

Haymarket Theatre.—Mr. W. S. Gilbert's new play, "The Wicked World," is the most complete work that he has yet produced,—a most ingenious fable admirably set forth,—and it is helped by the best acting, on the part of Miss Robertson, which that excellent actress has yet been led to exhibit. That it includes as many elements of popularity as "Pygmalion and Galatea" is not quite certain, but that it will long hold the public, and give pleasure to thousands, we have not the remotest doubt. In parts of the play, notably at the close of the second act, Miss Robertson displayed an amount of physical power with which her warmest admirers had scarcely credited her, and literally carried the house by storm. A more enthusiastic recognition, justly earned, has not been awarded to actor or actress for many a long day. Mr. Buckstone has a part full of fun, and Miss Roselle, Miss M. Litton, and Mr. Kendal efficiently carry out the author's views. The latter by portraying the fairy brother *Ethais* with feminine refinement, could produce a stronger contrast with his coarse and brutal counterpart from earth.

Mr. J. O'Connor has painted an elegant scene, "a fairy landscape on the back of a cloud"; but it does not convey exactly the actual situation: it should have represented in the background the earth as seen from fairy-land. Objections apart, all parties concerned in the production of "The Wicked World" are to be congratulated on a genuine success tending to the upward progress of the drama.

RAILWAY MATTERS.

Tenterden.—A correspondent of a contemporary says,—"I propose to start a line from Paddock Wood which would touch as near as possible, Brenchley, Horsemonden, Goudhurst, and Cranbrook. Then it should run so as to be useful to Benenden, and pass down the valley on the west side of Tenterden, which would be useful to Rolvenden. Then it should run to the west of Wittersham, which would be useful to Beckley, Peasmarsh, and Iden, and so onwards to Rye.—W. H. E., architect and surveyor, London." The tramway scheme has been abandoned.

Inauguration of a Railway in Japan.—A line of railway has been opened from Jeddo to Yokohama. The Mikado determined to inaugurate the opening himself, and this was one of the great attractions of the ceremony,—to see "the descendant of the gods," who had hitherto permitted himself to be seen but very rarely by his own people, delivering a speech and receiving addresses in the midst of a general *fête*. This, therefore, may be considered as another step taken in the path of progress. The importance of the event was recognised by all, and the attendance at the ceremony was immense. The Mikado is a very noble-looking young man, about twenty years of age, and rather tall, and with an olive tint of complexion, very regular features. He was dressed in a white tunic, and a mantle of yellow silk. His head-dress appeared to consist of a sort of chignon, formed of the back hair and brought to the top of the head, and surmounted with a small silk cap. The ceremony terminated with a splendid display of fireworks.

CHURCH-BUILDING NEWS.

Homerton.—The new church of St. Luke has been connected by the Bishop of London. It accommodates 750 persons. It is faced externally with Kentish rag-stone, with Bath-stone dressings, and has cost, as far as at present completed, about 5,000*l.* Mr. Carruthers, of Reigate, was the contractor, and Messrs. Newman & Billing were the architects.

Maryport.—The new Mission Church, which has been built on the north side of the harbour at Maryport, has been opened for divine service by the bishop of the diocese. The site for the building was given by Mr. J. P. Senhouse, the lord of the manor, and the edifice itself has been erected by public subscription. It has been built from the design and under the superintendence of Messrs. Charles Eaglesfield & Son, of Maryport, architects, and consists of a nave and one side aisle, with a circular apse or chancel. The style of the building is Early English. The nave is divided from the aisle by three arches. The roof is an open timber one. The structure will have, when properly finished, a tower and spire above the entrance, 100 ft. in height. The pews, which are open, and made of pitch pine varnished, will accommodate 340. The building generally will be lighted by gas from ornamental brass standards, but the chancel will be lighted by a corona, the gift of a lady. The walls are of red freestone from the Netherhall quarry; and the church is to be warmed by one of Gurney's patent stoves. The contractor for the mason's work was Mr. Marshall, of Maryport; for the joiner's work, Mr. Henry Dent, of Cockermouth; for the slating, Mr. Mandle, of Maryport; for the plastering, Mr. Johnson, of Carlisle; and for the plumbing and glazing, Mr. Anthony Piele, of Workington. The cost of the church, including the tower and spire, will be about 1,600*l.*, and a considerable portion of this amount has been raised. It is intended to furnish the tower with an illuminated clock with four dials.

Dorchester.—The Abbey church has now undergone a thorough restoration, the work extending over twenty-five years, and costing nearly 10,000*l.* The proportions of the church are now well displayed, and the Jesse window and the east window, with its stained glass, are plainly visible from nearly all parts of the edifice. The last and crowning portion of the work of restoration is the complete renovation of the roof of the south aisle of the chancel, which has just been accomplished from the designs of Sir Gilbert Scott. There yet, however, remains something to be done to this aisle, as some traces of a groined ceiling have been discovered, and it is the wish of the vicar to have this thoroughly restored. A marble reredos, coloured glass for the windows, more and improved seating, a new

pulpit, eagle lectern, completion of the organ, are among the few adornments which the Abbey still requires.

Bromyard.—Avenbury Church has been closed for the last few weeks for the purpose of undergoing some necessary repairs and improvements, previously, as is hoped, to its complete restoration at no distant period, according to the plans and designs of Mr. F. R. Kempson. It has been re-opened.

Chedburgh.—The parish church of All Saints, Chedburgh, has been re-opened, after being closed since last August for restoration. In the course of the restoration, on stripping off the plaster from the inside of the walls, a rude rood-loft staircase was discovered, more or less mutilated, for which the sill of the Early westernmost window on the north side had been cut away, the hole (for it could not be called an arch) which led out on the rood-beam being so small as only barely to have admitted a person in a stooping posture. A single sedile for one priest was discovered on the south side, which has been removed, and is to be placed in its proper site in the present chancel. The remains of an aumbry and piscina, much mutilated, were also discovered. In the church is a quatrefoil west window. The church is very small in dimensions. It is in the Decorated style.

Abingdon.—The chancel of St. Peter's Church, Drayton, which has been entirely rebuilt, and a new chancel aisle, which has been added, have been opened by the Bishop of the diocese. The work has been carried out by local labour. The architect was Mr. E. Dolby, of Abingdon, who superintended the work. The old east window has been retained and filled with stained glass. A new window has been placed in the west end under the tower.

Lewisham.—A Reredos of Caen stone has been erected in St. Mark's Church, the design of which comprises a centre portion of three moulded arcades, embracing the width of the altar-table; and pinnacled supports, crocketed, on either side containing four niches for the reception of figures of the evangelists, which it is proposed to carve in statuary marble, and insert when the funds permit. The middle compartment of the arcade is deeply recessed, and a statuary Calvary cross on a gold ground placed therein; and above it is erected a light tabernacle-canopy supported on four polished Peterhead shafts, with the angels Michael and Gabriel supported on pinnacles on either side. In the panels of the side compartments are carved, on a diapered ground, the symbols of the Agnus Dei and the Pelican, and in the spandrels the Dove and the Alpha and Omega. The whole is profusely carved, and has been studied with a view to its emblematical teaching. The whole of the work has been executed by Mr. George Whittingham, of Kennington-park Road, and designed by the architect of the building Mr. Wm. C. Banks, of London, who also has designed the scheme for filling the whole of the traceried windows with stained glass. The centre portion of the reredos was the gift of Mr. Lonsdale.

Norwell (Notts).—The Ecclesiastical Commissioners have granted 1,500*l.* towards the restoration of this village church, provided the parishioners and others interested can guarantee that all the works specified in the report of their architect, Mr. Christian, shall be done. At a recent meeting to consider the report, 342*l.* were subscribed. It is calculated that about 650*l.* are still wanted.

Wotton Fitzpaine.—The architect engaged on the works at this church writes to say, with reference to a previous notice in our pages (1031, vol. xxx.), that "The church is not dedicated to St. Paul. The proper dedication has not yet been discovered. The vestry and transept are additions, and have not been 'restored.' The chancel seats are in deal. The east window was reglazed precisely as before, the glass being of the worst description." For "Messrs. Christian, Malford, & Co.," read, Mr. Christian.

Ealing.—The completion of St. Mary's, Ealing, has been celebrated by a series of services. The present edifice supersedes one which had served the purposes of a church for about 130 years past, and which was constructed of red brick, with a square tower at the west end. The old edifice has been partially incorporated in the new, and an apse and ambulatory have been formed, and the flat ceiling has been taken away and replaced by an open roof. The style adopted is Byzantine in character. The works, under Mr. Teulon as architect, have been prosecuted for some years past, and their cost has amounted to 11,500*l.* A small portion of this amount remains to be made up. Apart from this, however, there have been special gifts, including the reredos and some stained glass windows.

Manchester.—The Church of the Holy Innocents, which has been built at Fallowfield, at a cost of 9,000*l.* has been consecrated by the Bishop of Manchester.

SCHOOL-BUILDING NEWS.

Redcar.—A new schoolroom has been opened here by the Congregationalists. The building is in the Gothic style of architecture, and erected at a cost of about 450*l.*, and is capable of holding about 200 scholars.

Honley.—The three national schools here, which have each been enlarged by an addition of 21 ft. in length and the building of three class-rooms and lavatories, have been reopened. The cost of the additions will be about 1,250*l.*, towards which Government has promised a grant of 246*l.*, leaving 1,000*l.*, in round figures, to be raised by voluntary effort; some 820*l.* have been contributed, leaving a deficiency of 162*l.* 6s. 8d. This alteration, the extra site for which was given by the Earl of Dartmouth, will, when the Brockholes Schools are completed (about two months hence), furnish all the schoolroom accommodation required under the Elementary Education Act of 1870 in the township of Honley.

Hucknall Torkard.—The new public schools that have been ordered to be erected by the Hucknall Torkard School Board have been opened. The building is divided into three schools, comprising seven class-rooms, and having the master's room attached. The total accommodation provided is for 600 children, namely, 150 boys, 200 girls, and 250 infants. The schools have been built with the consent, of course, of the Education Department, and the total cost of the buildings and site is about 1,800*l.*

Dallington.—The new school class-room and lobby, which have been in course of erection during the last four months, have been formally opened. The new building has been erected from plans prepared by Mr. E. Piper, of Robertsbridge, and executed by him, comprising a large and lofty room, 19 ft. by 15 ft., and 18 ft. high, with cloak-room at the back. The cost will be about 200*l.*, to which the grant of the Government Education Department is 35*l.* 12s. 6d., and of the Chichester Diocesan Association is 30*l.*

FROM SCOTLAND.

Banchory.—The foundation-stone of a new town-hall for Banchory has been laid, in the presence of the town council and a large concourse of spectators, by Dr. Beveridge, provincial grand master of the Aberdeen Freemasons. A public dinner and ball, held at night, completed the proceedings.

STAINED GLASS.

Roman Catholic Chapel, Stoke-upon-Trent.—A new stained-glass window, on which the Good Shepherd and other figures are represented, has been placed in St. Peter's altar window, in the Roman Catholic Church, as a memorial of the late Father Dent. The work has been carried out by Hardman, of Birmingham.

Books Received.

Rawle's School of Art Series. London: Simpkin, Marshall, & Co.

MR. RAWLE'S freehand and geometry series of drawing copies have been tried experimentally at the Nottingham School of Art during the past five years, and one recommendation for their use certainly lies in the fact that the above school has now for four consecutive years taken the highest number of prizes amongst all the provincial schools of art in the kingdom. The directions and diagrams of construction make the series very useful.

VARIORUM.

THE *Engineer* makes a pertinent suggestion as to the recent floods:—"It is difficult to travel just now north or west of the metropolis without meeting with enormous districts completely under water, as a result of the almost unceasing rains of the last few months. The value of the property destroyed by these inundations is very great,—much greater than those not specially interested can conceive. In certain districts such floods prevail every winter. This year the rainfall has been excessive, and, as a result, the floods have extended over lands hitherto usually dry in winter, or almost dry. But what has happened in 1872 may happen again and again in succeeding years. Taking all things into consideration, we do not think we shall exaggerate if we state that the inundations of each winter represent a loss of at least a quarter of a million to the nation,—a sum which would pay 5 per cent. on five millions sterling. We believe that these inundations represent strictly preventible calamities. If the flood waters could be carried off by the reservoirs there would be no inundations. It is quite practicable for a small sum,—at a cost indeed less than the sum we have to pay on the *Alabama* awards,—to effect such improvements in our rivers as will not only almost entirely save very extensive districts from inundation, but reclaim for the use of the agriculturist thousands of acres now given up to snipe and wild fowl."

——The *Art Journal*, speaking of "Tortoiseshell," says,—The appearance of tortoiseshell may be given to horn by brushing it over with a paste made of two parts of lime, one part litharge, and a little soda-lye, which is allowed to dry. This is the same as the Indian hair-dye, and acts by forming sulphuret of lead with the sulphur contained in the albumen of the horn, producing dark spots, which contrast with the brighter colour of the horn. Artificial tortoiseshell is made by melting gelatine with various metallic salts. The greatest comb-manufactory in the world is in Aberdeen. There are thirty-six furnaces on the works for preparing horns and tortoiseshell for the combs, and no less than 120 iron screw-presses worked by steam. Forty years ago ladies' back-combs,—which were larger than ladies' bonnets are now,—were made in England and the United States for the Spanish Peninsula and South American markets. They were often a couple of feet wide, encircling two-thirds of the head, and from 6 in. to 1 ft. high on the back, the top being wrought in open work; to these the Spanish ladies attached their veils. As much of the work was done by hand and with the saw, and the polishing was entirely manual, the prices were high, averaging 3*l.* to 4*l.* . . . . Tortoiseshell was much used to decorate furniture by the Romans. According to Pliny, Carvillus Pollio was the first to apply tortoiseshell to ornamental purposes. The fashion for this style of decoration increased; and in the days of Augustus, the patricians ornamented their doors and the columns of their rooms with this substance. —— "The Tiny Library" (Partridge & Co.) consists of a number of amusing little stories, prettily illustrated and bound. The price is "tiny," too.

Miscellanea.

Land Sales in Manchester.—The *Manchester City News* states that the sales by auction of real property,—land, houses, chief rents, and works,—in Manchester and its neighbourhood during the past year amounted to a total of 728,897*l.*, showing an increase on 1871 of 292,620*l.* A few considerable estates, such as that of Risley, near Warrington, and the Burgh Hall estate, near Chorley, will partially account for the increase, but the transfer of property in the city and neighbourhood has actually been on a larger scale and has included a greater number of valuable sites than were offered in the preceding year. Among the noteworthy prices per square yard obtained were the following:—In Great Ancoats-street, 12*l.* 10s. 6d., a remarkable rate for land in that locality; in Mosley-street, a residence, 29*l.* 10s.; in Chancery-lane, 33*l.*; at the corner of Mark-lane and Withy-grove, 34*l.*; in Fountain-street, 41*l.* 15s. 6d.; and at the corner of St. Ann's-street and Cross-street, 64*l.* 11s. 6d. per square yard. The last is believed to be the highest price of the year, and the site was subsequently sold by private treaty to a limited company at an enhanced figure.

New Church in Bradford, Yorkshire.—In limited competition, Messrs. Walford & Pollard, of this town, have been appointed architects for the new church of St. Mark, Manningham-lane, Bradford.

Supposed Discovery of the Queen of Sheba's Palace.—M. Mauch, an African traveller, thus writes:—"I believe that I have found the real Ophir, in lat. 20 deg. 15 min. S., long. 26 deg. 30 min. E., and I think I possess proofs of the fact. The ruins which have been so often spoken about are composed of two masses of edifice, in a tolerably good state of preservation. The first is on a mountain of granite; and, amongst other constructions, is to be remarked one which is an imitation of the Temple of Solomon, being fortress and sanctuary at the same time, the walls of which are built in wrought granite, without mortar, and still being more than 30 ft. high. Beams of cedar served as ceiling to the narrow and covered galleries. No inscription exists, but only some special designs of ornamentation which announce a great antiquity. The whole western part of the mountain is covered with blocks of great size, which seem to indicate terraces. The second mass of ruins is situated to the south of the mountain, from which it is separated by a low valley; it retains a well-preserved circular form, with walls constructed as a labyrinth, also without mortar; a tower still exists, 30 ft. high, 17 ft. in diameter at the base, and 9 ft. at the top. The circular edifice is accompanied by a large number of others situated in the front, and which doubtless served as the habitation of the Queen of Sheba's suite. I have drawn, not without difficulty, a general sketch and a plan of this palace. I was confirmed by the natives themselves in the idea that these ruins date from the Queen's time. Forty years since sacrifices were still offered up on the mountain. The natives still call the circular building the house of the Great Princess."

Lisbon Steam Tramway.—An experiment has been tried in the neighbourhood of Buckhurst-hill, on the Great Eastern Railway. The line on which the trial was made is 1,710 ft. in length, and was laid out specially for the purpose of the experiment, and consists of three rails, the two outside being of timber, the centre one of iron. It is, indeed, almost incorrect to call the outside ones rails, as they are perfectly level, and about 9 in. wide. The outside one supports the engine, while the centre rail sustains the carriages, and guides the locomotive. By this arrangement the tilting of the carriages is prevented, and the friction is also thereby greatly diminished. In appearance the central mechanism might remind one of a bicycle, and by connecting a hydraulic ram with the engine the bulk of the weight can be readily transferred from the central iron to the outside wooden rails. There is also a continuous-chain break. The carriages conveyed were two second-class, each capable of containing eighteen persons, and one goods van; and although the train had to meet a gradient of 1 in 17 at its severest point, and an average one of 1 in 22½, as well as extremely sharp curves, the speed was maintained satisfactorily, and there was very little oscillation. The new traction method seems to be something like a compromise between, or rather a union of, the railway and the tramway, and would, it is thought, probably afford a convenient mode of conveyance between railway stations and somewhat distant towns, as well as in other ways. The present carriages are intended to ply between Lisbon and Cintra, in Portugal. Mr. T. H. Trevithick, engineer and designer of the stock, is the inventor.

The Great Hoosac Tunnel.—The junction of the east heading and the central shaft of the Hoosac Tunnel has been effected. The tunnel under the Hoosac Mountain, in the north-western corner of the state of Massachusetts, is to be inferior in length only to the so-called Mont Cenis Tunnel, and its completion is now certain and near. The opening of the passage-way will be turned immediately to practical account. The large quantity of water which the rock, westward from the central shaft, has been making, has heretofore been pumped, at enormous expense, to the surface, 1,030 ft. The east end will henceforth be its outlet. The pumps are all ready to throw the water over the bench, which is but 12 ft. or 13 ft. high, whence it will naturally find an outlet in the drain at the eastern end. Work will therefore be immediately resumed from the central shaft westward, and Mr. Shanly fully expects to open the hole through the mountain next October. Early in the spring of 1874 the railroad may be in running order from Boston to Troy through the Hoosac Tunnel, and a new and very important route to the West will thus be opened.

The Rainfall at Greenwich in 1872.—It appears from the quarterly and weekly meteorological returns which have been made to the Registrar-General by Mr. Glaisher, that the amount of rain that was recorded at the Royal Observatory in the year ending the 28th of December last, was equal to 29·86 in.; and as the amount collected on the last wet day of the year was probably not far short of 0·15 of an inch, this will bring the total amount of rain for 1872 up to 30·01 in. In 1871 the rain was 22·5 in., and in 1870 it was as little as 18·5. The average excess of rain in fifty-six years now to be noted is nearly equal to 5 in. The London water companies report that their supply to the metropolis in the month of November was equal to 103, 160, 349 gallons; at this rate the rain that fell in 1872 would, if it were properly stored, be sufficient for the supply of London during a perid of nearly six months. It would be well if some plan of water storage could be carried out in the large town districts. The state of the public health, as we early pointed out it would be, has been in the highest degree satisfactory during the prevalence of the wet weather. Our sewers should be better flushed, and our streets and alleys more effectually washed, at frequent intervals.

Flower-sticks. — The *Gardeners' Magazine* points out that, for ordinary purposes, the best flower-sticks are made by splitting what are known as four-foot double-selected laths, which the bricklayer or lathrender will supply. These should be split and cut to proper lengths, the edges rounded off, and the ends pointed, and then the whole should have two coats of paint. They will last longer if the pointed ends are dipped in hot pitch, which prevents their rotting in the soil. Flower-sticks of this sort are generally painted green, but they should be separated into two or three lots in sizes, and be painted two or three different colours, such as reddish brown, green, and dark umber. These three colours will match nearly all the various kinds of stems of plants which the sticks may be used to support. The strong shoots of fuschias that have been cut down in the open ground make excellent flower-sticks, and need no painting, because of their natural colour; the hardy fuschia called Riccartoni makes first-rate flower-sticks, and the common Snowberry may be cut down for the same purpose—the stout rods trimmed for sticks and the light ones put aside for use as pegs, for which purpose they are very tough and trustworthy.

The Trades Congress in Leeds.—At the Trades Congress to be opened in Leeds on the 13th inst. papers will be read on the following subjects:—"The Inefficiency of our Present Factory Inspection;" "Agricultural Labourers;" "Criminal Law Amendment Act;" "Trade Societies, their necessity, objects, and usefulness;" "Trades Councils, their necessity and utility;" "International Arbitration;" "A review of the past, present, and future condition of the operative potters who work under the system of good from oven;" "The limitation of apprentices;" "Good from oven in the Potteries;" "The advantages of Amalgamated Societies;" "The necessity for a thorough amalgamation on federal principles of every combination of labourers, whether urban or rural;" "Direct representation of labour in Parliament;" "The amalgamation of all trades on federal principles, in cases of strikes and lock-outs;" "Co-operation and industrial partnerships;" "The application of the law of weights and measures to factories and workshops;" "Trade-unions, strikes, and productive co-operation;" "Trade-unions, from a national aspect."

Sanitary Inspectors.—We copied last week from our contemporary, the *Builder*, an elaborate summary of the duties of the sanitary inspectors under the new Health Act, and hinted a doubt whether there could anywhere be found men so many-sided in their talents and attainments as that they could fulfil the requirements of the Act thus explained. But either our contemporary has over-rated the office, or there must be scattered over the country endless flowers "wasting their sweetness on the desert air." For example, in a recent advertisement in the *Andover Advertiser*, the guardians offer 3*l.* a year for a nuisance inspector of a district containing an acreage of 28,651, and a population of 3,538; and in an adjoining union,—Stockbridge,—two inspectors of nuisances have been appointed, at a salary of 5*l.* per annum each, the acreage of each district being over 30,000.—*Gloucester Chronicle.*

The Steel Manufacturers and the High Price of Fuel.—A meeting of the Sheffield steel manufacturers has been held, for the purpose of considering the high price of fuel, and of taking steps with the object of reducing the demand, and thus bringing down the price. At a previous meeting it was suggested that the steel works in Sheffield should either be altogether closed for two months, or that the steel-melters be only employed three days a week, and the meeting was adjourned, in order that both these courses might be thoroughly considered. Between the two meetings, however, there had been a further increase in the price of coal, and in that of some descriptions of coke, and under these circumstances manufacturers considered it would be almost hopeless to attempt to obtain a reduction by any united action on their part. The meeting was therefore again adjourned. A very strong opinion was expressed that the state of trade did not warrant the enormous prices now charged for coal and coke.

Greenock Harbour Improvements.—On the 29th January, the Greenock Harbour Trust obtained a new Harbour Act, which increased the borrowing powers, and enacted a number of regulations for the government of the port and harbour. The principal object of the Bill was to enable the trustees to construct a wet dock at Garvel Park. The Caledonian Railway will ask powers in the coming session of Parliament to form a connexion at Garvel Park. A fine graving-dock at Garvel Park is now approaching completion. In addition to these and other new constructions, the harbours, docks, quay-walls, cranes driven by water and steam, and other works, have been maintained in efficient order, and made to keep pace with the growth of the port and the increase of mechanical inventions likely to add to efficiency. Mr. W. R. Kinipple is the engineer.

The Increase in the Price of Gas.—An increase in the price of gas to consumers at the West-end having been determined on, consequent upon the amalgamation of the Western gas companies, a conference of the ratepayers of Kensington has been held in the Kensington vestry, to determine the best course to be adopted under the circumstances. The chair was occupied by Mr. H. Gibbons, who was supported by many influential residents in the neighbourhood. Mr. A. Taylor then proposed the following resolution:—

"That this meeting strongly protests against the threatened increase in the price of gas, and is of opinion that gas supplied by the City of London and other gas companies at 3s. 9d. a thousand, is as good, if not better, in quality, and more suitable to the wants of the parish than the gas supplied by the Western Gaslight Company as 'Cannel coal gas.'"

The resolution was unanimously carried. Other appropriate resolutions were passed, and a standing committee was appointed to carry them out.

Whitby.—The trade in this town for the year 1872 is said to be unprecedented in extent. More than one-twelfth of the inhabitants are engaged in the staple trade, the jet manufacture; and the amount of money employed approaches 300,000*l.* annually. This, in so small a town as Whitby, with only 13,000 inhabitants, speaks for itself. It is likely that the jet trade will be still further developed. The supply of the rough material is greater than it used to be, especially since the introduction of the stuff called Spanish jet. Another trade, the building of iron ships, has sprung up recently. In other respects the town has shown signs of activity. Two new lines of railway have been commenced,—one from Whitby to Lofthouse, a distance of 16¼ miles; and the other from Whitby to Scarborough, a distance of about 18 miles.

New Cooking Range at the Banbury Workhouse.—One of Jones & Rowe's cooking-ranges has been fitted up at the Banbury Union Workhouse. The patentees, who are well known as horticultural engineers, carry on business in Worcester. According to the *Worcester Herald*, its special advantages are economy of fuel, one fire sufficing for boiling, roasting, baking, broiling, steaming, and supplying hot water to laundries, baths, &c., and this alone must render it expressly adapted to the requirements of such institutions as union workhouses, asylums, hospitals, and the like. Great satisfaction with this complete apparatus was given with the first trial of it at the Banbury Workhouse, which was the cooking of the Christmas dinner.

St. George's, Hanover-square.—The Committee of Works have recommended the vestry to adopt the following estimates for the year ending Lady-day, 1874:—Maintenance of roads, 12,247*l.* 6s. 8d.; paved footways, 322*l.* 10s.; paved carriage-ways, 1,608*l.* 5s.; gravel footways, 75*l.*; casual repairs, 1,750*l.*; lighting, 9,929*l.* 14s. 6d.; watering, 3,966*l.* 17s. 3d.; cleansing, 9,242*l.* 3s. 8d.; total, 39,141*l.* 17s. 1d. This does not include 2,271*l.* 7s. 10d. for sewer works, besides an additional outlay of 1,700*l.* Should the vestry adopt these estimates, they will involve an additional rate of 1¼d. There are recommendations to lay down asphalte on the footways in various parts of the parish, at a cost of 194*l.* 10s., and to lay down wood-paving as supplied by the Improved Wood Paving Company in Piccadilly, between Berkeley-street and Albemarle-street, at a cost of 1,150*l.*

The Redcliffe Sanitary and Ventilating Trap.—This is the title given to a cheap, earthenware trap invented and patented by Mr. McNeil Greig, and at present chiefly used on the Redcliffe Estate, South Kensington. It holds more water than most traps, and so gives greater chance of security, and has a second inlet, also trapped, to receive water from sinks or areas, which serves to flush out any sediment deposited in the bottom of the trap. The hole provided in the crown for a ventilating pipe would be more useful if it were in the front part of the trap, nearer the outlet, instead of being behind the bridge. Mr. Greig has made some smaller traps of the same form: all very cheap and good.

Ozone.—The *Journal of the Franklin Institute* says that Dr. Loew has procured a patent for a method of manufacturing ozone, which depends upon an observation first made by him some time ago, and which then created considerable discussion as to its correctness, in various scientific papers. The observation is, namely, that if cold air be blown through a flame, it is converted partly into ozone. The apparatus designed by the inventor to utilise his process consists of a number of Bunsen burners, placed in a row, and as many horizontal tubes, arranged at a certain distance above the burners, through which cold air is blown against the flames. Opposite to these tubes are placed a number of funnels, to collect the accumulating ozone.

Slate Quarries on the Lochiel Estates.—A correspondent of the *Weekly Scotsman* states that the slate quarrying, begun some months ago on Mr. Cameron, of Lochiel, M.P.'s, estate, at Onich, continues to be of a most promising character. Seams of slate varying from 5 ft. to 15 ft. have been bored through horizontally, and from the nature of the surface tunnelling there is every indication that the depth of seam lies much under the sea line. The quality of the slate found is stated to be equal to Welsh in durability, and the working of these quarries will, it is expected, greatly augment the trade and revenue of the Caledonian Canal.

A Crystal Palace for New York.—The people of New York, encouraged by the example of the Crystal Palace in London, have determined to commence a similar undertaking in their own city. The "Industrial Exhibition Company" has been started, and a grand dinner was given at the St. James's Hall, in order to discuss the position and prospects of the company. The directors intend issuing 1,875,000 dollars stock, at 80 cents on the dollar, and to purchase a plot of ground outside the city, at a cost of about 952,000 dollars, for the erection of a permanent industrial exhibition. The matter is said to be in very good hands.

The Vienna Universal Exhibition of 1873.—Notices have been issued to British exhibitors that a special law for the protection of industrial designs and inventions at this Exhibition has been sanctioned by the emperor and published; and that the frontier custom-houses will direct goods to the chief custom-house in the Exhibition, and the chief custom-house back to the frontier custom-houses, under certain regulations announced; goods remaining in Austria or Hungary being liable to import duty within three months after the close of the Exhibition if not then entered for exportation.

Builders' Foremen.—Complaints reach us against the fitness of the foremen employed by certain large builders, but we cannot give currency to charges on *ex parte* evidence. The builders themselves ought to be the best judges.

New Buildings.—On Christmas-day a new Welsh Calvinistic Methodist Chapel was opened at Craig, near Bangor, the architect being Mr. R. G. Thomas, Menai Bridge, and the contractor Mr. Evan Williams, Bangor; the total cost was about 1,800*l.* Mr. Thomas has also in course of erection a large mansion at Treborth, for Mr. R. Davies, M.P. for Anglesea; and at Trevecca College, South Wales, a handsome memorial chapel to the late Howel Harris, one of the founders of Welsh Calvinistic Methodism.

Mr. John Jay, Contractor.—We regret to have to announce the death of this gentleman, at his residence in Hornsey. He has been long known as an eminent contractor, having executed many undertakings of great extent, not only in the metropolis, but in various parts of the United Kingdom. He was the first contractor for the Metropolitan Underground Railway. His remains have been interred in the family vault at Abney-park Cemetery.

A New Clock for Market Drayton.—The parishioners of this town having decided upon the erection of a clock in the parish church, a subscription enabled the committee to place the work in the hands of Mr. Smith, of Derby. It is now complete. It strikes the hours upon a bell of 18 cwt., and the quarters on bells in proportion. The time is shown upon four large dials (one illuminated).

Paris.—Workmen will shortly be occupied in clearing away the ruins of the Tuileries. They are also employed in making some interesting repairs in the Palais des Thermes, at Paris, the relic of the old Roman edifice inhabited by the Emperor Julian. There is also some question of repairing the façade of the Hôtel-Cluny, which is falling to ruin. M. Viollet-le-Duc will have the direction of the works.

Proposed Art Gallery for Liverpool.—This project is again talked of in the town: we shall be glad to see it persevered with. It appears that pictures to the amount of about 13,000*l.* have been sold during the past two years in the public exhibitions in Liverpool, in addition to what have been sold from the exhibitions of Messrs. Agnew, Grindley, and others.

Caution to Brass Founders and Others.—An account comes from America of the destruction of the jaw-bone of a workman, poisoned by the fumes of zinc. The man was a brass-founder, and in pouring the alloy of copper and zinc, the fumes were thrown off. The action of the zinc fumes upon the bones of the human system appears to be analogous to that of phosphorus.

The Leeds Borough Engineer and Surveyorship.—A recommendation was made to the council at their meeting on Thursday, to appoint one of the three following gentlemen borough engineer and surveyor:—Mr. A. W. Morant, Norwich; Mr. J. Lemon, Southampton; or Mr. P. Paul, Tottenham.

The Ironworkers of South Staffordshire and East Worcestershire have accepted the terms offered by the masters, and will continue to work at present prices for three months. At the expiration of that time a new basis of agreement will be sought by the men.

Institution of Surveyors.—The next meeting will be held on January 13th, when the discussion on the paper by Mr. Arundel Rogers, "Mines and Minerals," will be resumed; and, should time permit, a paper will be read by Mr. E. J. Castle, entitled "The Origin of Parochial Relief."

The Queen of Diamonds.—The discovery of a diamond of enormous weight is reported from the Cape. It is said to be of 288 carats, in colour a light yellow, shape good, though slightly flawed on the surface. In weight this surpasses all known stones.

Mr. Rickman.—The newspapers announce the death, on the 3rd inst., at Rhyl, of Mr. Edwin Swan Rickman, architect, late of Birmingham, aged eighty-two years.

Co-operative Conference in Leicester.—A quarterly conference of delegates from the Midland Counties Co-operative Societies was held in Leicester Town-hall, on Saturday.

TENDERS

For building a cottage, with workshop in rear, at Weymouth-terrace, Haggerston, London, for Mrs. H. Baker. Messrs. Ebbetts & Col b, architects:—

Ferne (accepted)	£325 0 0

For new building, Bear-gardens, Southwark. Messrs. John Young & Son, architects:—

Coleman	£2,469 0 0
Killby	2,379 0 0
Pritchard	2,377 0 0
Hart	2,347 0 0
Elkington	2,300 0 0
Merritt & Ashby	2,197 0 0
Newman & Mann	2,183 0 0
Robbins & Co.	2,180 0 0

For alterations, St. James's-place, Aldgate. Messrs. John Young & Son, architects:—

Philps & Besiker	£1,090 0 0
Axford & Co.	1,047 0 0
Perry	1,012 0 0
King & Son	1,010 0 0
Newman & Mann	995 0 0
Merritt & Ashby	933 0 0

For new coffee and billiard-room, &c., to Bulkeley Arms Hotel, Beaumaris, for Sir R. B. W. Bulkeley, bart. Mr. R. G. Thomas, architect:—

Pritchard (accepted)	£836 0 0

For schools, Princess-road, Croydon, for the Croydon School Board. Mr. Henry Dawson, architect. Quantities by Mr. C. N. McIntyre North:—

Henshaw & Co.	£8,371 0 0
Rider & Sons	7,990 0 0
Colls & Sons	7,944 0 0
Woodward	7,324 0 0
Peskett & Taylor	7,323 0 0
Higgs	7,150 0 0
Holledge	6,995 0 0
Hyde	6,975 0 0
Smith*	6,136 0 0

* Withdrawn on account of error in cast.

For alterations to Christ Church, Leicester. Mr. J. Goddard, architect:—

Herbert	£828 10 0
Knight & Hodgkinson	755 0 0
Osborne, Brothers	728 0 0
Ratcliffe	710 0 0
Nicholson	619 0 0
Thrall, Vann, & Co. (accepted)	617 0 0

For alterations and additions to Abney Chapel, Stoke Newington:—

Brindle & Co. (accepted)	£935 0 0

For a new window to be erected at the west end of the parish church, as a memorial to Dr. Harvey, the discoverer of the circulation of the blood. Mr. S. Slingsby Stallwood, architect:—

Adcock & Rees	£204 10 0
Bowley	159 0 0

For new town-hall, St. Helen's. Mr. Summers, architect:—

	Municipal Department.	Police Department.
Latham	£28,524 0 0	£11,476 0 0
Middlehurst	27,825 0 0	11,130 0 0
Harris	27,500 0 0	11,360 0 0
Harrison	27,745 0 0	11,200 0 0
Jones & Sons	27,427 0 0	11,032 0 0
Hague & Co.	27,196 0 0	10,647 0 0
Urmson*	25,294 0 0	10,159 0 0

* Accepted.

For chapel at Canning Town. Mr. Finch Hill, architect. Quantities by Mr. Goode:—

Gibson, Brothers	£2,055 0 0
Ennor	2,016 0 0
Patrick & Sons	1,968 0 0
Morter	1,938 0 0
Killby	1,930 0 0
Dove, Brothers	1,925 0 0

For completing No. 32, Warrington-crescent, Maida-hill, N.W., for Mr. Henry Vallance. Messrs. Fowler & Hill, architects. Quantities supplied:—

Mallett	£2,546 0 0
Nixon & Sons	2,316 0 0
Taylor	2,137 0 0
Reid	2,128 0 0
Johnson & Co.	1,988 0 0
Everal	1,945 0 0
Butland	1,850 0 0

TO CORRESPONDENTS.

E. E. (if a party garden-wall it should be jointly rebuilt. The leases, &c. must be looked to).—J. S. (the front of Apsley House is said to be of *Bath* stone).—Constant Reader (in reply, Messrs. Mears & Stainbank say a bell 14 inches diameter, 62 lb. weight, will require a clapper to weigh 3 lb.).—Mr. R.—W. E. K.—H. F.—G. T. C.—G. M.—A. C.—J. M. G.—A. N. B.—M.—E. C.—J. A. P.—B. F.—E. W.—J. I.—W. & J. B.—D. & D.—Th. B.—Joiner of Fifty Years.—J. L.—E. D.—W. R. C.—C. H. P.—B. & Co.—Messrs. P.—H. E. F.—C. F. M.

We are compelled to decline pointing out books and giving addresses.

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